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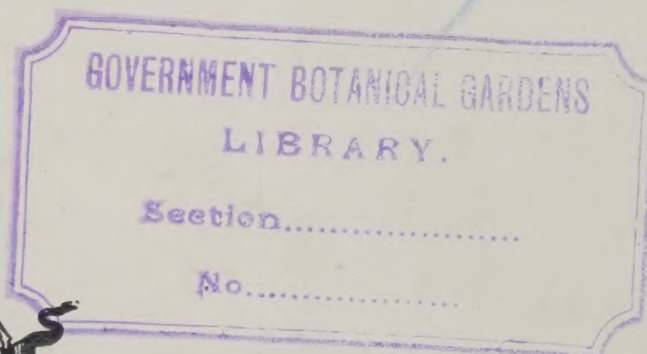








A FORTNIGHTLY REVIEW  
OF THE  
IMPERIAL DEPARTMENT OF AGRICULTURE FOR THE WEST INDIES.



VOLUME VI.

JANUARY TO DECEMBER 1907.

ISSUED UNDER THE AUTHORITY OF THE  
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## Canadian Trade Delegation to the West Indies.

IN an editorial in a previous issue of the *Agricultural News* (Vol. V, pp. 337-8) mention was made of a meeting held at the Halifax Board of Trade Rooms on October 4, at which the Imperial Commissioner of Agriculture suggested that a delegation of Canadian business men should visit the

West Indies to meet representatives of the mercantile communities for a discussion, with a view to the mutual exchange of their several commodities.

The suggestion was actively taken up by the Halifax Board of Trade, which invited the co-operation of the Boards of Trade in Montreal, Toronto, and St. John, while Messrs. Pickford & Black made practical proposals for the carrying into effect of Sir Daniel Morris' suggestion. These proposals are set forth in the following letter addressed to the Secretary of the Halifax Board of Trade :—

When Sir Daniel Morris, K.C.M.G., Imperial Commissioner of Agriculture for the West Indies, was in Canada in September last, a meeting of merchants and others interested in the West India trade was held in the rooms of the Halifax Board of Trade, at which Sir Daniel Morris and the Hon. N. Darnell Davis, C.M.G., of Demerara, delivered addresses. In the course of Sir Daniel Morris' remarks, he suggested that a delegation of Canadian business men should be sent to the West Indies to discuss trade issues with the West Indian business men and Chambers of Commerce, with a view to establishing closer trade relations between the two countries.

The suggestion we think a good one, and we would very much like to see a strong delegation sent from Canada, and, with this in view, we would be prepared to assist it all we possibly can.

Representatives leaving here in the S. S. 'Olenda' on February 15, could call at the principal islands and could be back in Halifax or St. John on March 23. The islands and places called at would be : Bermuda, St. Kitt's, Antigua, Dominica, Barbados, Trinidad, and Demerara on the outward and homeward voyages, and also St. Lucia on the homeward voyage.



Our ideas are that a strong delegate from each of the following Boards of Trade, viz., Toronto, Montreal, St. John, and Halifax, should be appointed to go out; that the different Boards should exchange ideas as to the subjects to be discussed, and have the subjects decided promptly, so that the delegates may have time to post themselves fully before leaving. After the subjects are decided on, they should be sent to the Chambers of Commerce at the different ports of call, in advance, to give the Chambers time to think them over.

If it is decided to send the delegation, our company will carry these delegates free. The free transportation will include meals and stateroom. We will also do all we can through our agents in the West Indies to make the trip a success.

We feel it is not necessary that we should say anything about the desirability of sending delegates who are good public speakers and competent to deal with trade relations in a broad manner. The whole plan involves an advertising opportunity for Canada, which may be of very considerable help in developing a greater confidence regarding this country among the West Indian people; it should, therefore, if taken up at all, be handled as well as it can be done.

We should like to have your views on this question, and would also like to know whether you would care to make the arrangements with the other Boards of Trade mentioned.

Considerable interest has been aroused, both in Canada and in the West Indies, in this proposed trade delegation, and the press in both countries has voiced the opinion of business men as to the great benefits likely to accrue from it. The delegation is assured of a hearty welcome in the West Indies.

The *Maritime Merchant*, of November 29, 1906, expresses the hope that, as an outcome of this proposal, a permanent institution will be established, of the nature of an Intercolonial Board of Trade, whose annual meetings—at a point convenient for delegates of both countries—‘would have a tendency to develop a better understanding and a better desire to do business, which elements would pave the way, not only for larger and better trade relations, but for some-time political union, if this is to be the ultimate destiny of the two countries.’

In the course of an interview with a representative of the same journal, the President of the St. John Board of Trade, who will probably be the representative of that board on the forthcoming delegation, said: ‘The possibilities of developing trade are good, though chiefly with the larger markets, such as Barbados, Trinidad, and Demerara. There is a very large trade between these places and New York, of which Canada

should get a share, if the manufacturers were willing to grapple with it. As a result of my own visit to the West Indies, I am convinced that the only way in which trade can be developed satisfactorily is by personal and careful attention to details on the part of the exporters and manufacturers of Canada. . . I have found the West Indian merchants I deal with very prompt, and our relations have been very satisfactory, but Canadian merchants need to pay greater attention than in the past to matters of detail.’

Now that this proposal has assumed definite shape, and a Canadian Trade Delegation is likely to visit the West Indies in the course of the next few weeks, it remains for the commercial communities in the various islands to take such steps as will lead to the greatest possible advantage being derived from the discussion of business relations between Canada and the West Indies.

This is a matter that will, no doubt, call forth energetic action on the part of the Chambers of Commerce or Commercial Societies, or, in the absence of these, of the Agricultural Societies, in conjunction with the agents of Messrs. Pickford & Black in these colonies.

### BOTANIC STATION, GRENADA.

Mr. R. D. Anstead, B.A., Agricultural Superintendent, Grenada, writes of specimens of plants in the Botanic Station as follows:—

Considerable progress has been made during the past year in correctly labelling hitherto unnamed specimens growing in the Botanic Station, Grenada. A valuable addition to the list has just been obtained, through the courtesy of Mr. W. E. Broadway, the late Curator, in the name of a rubber vine, which has been determined from material sent to Kew as *Parameria glandulifera*, Benth.

The species is a pendulous shrub, with a milky juice and white fragrant flowers. The leaves bear on the under-side small glands in the angles between the midrib and the veins.

Reference to other species of *Parameria* will be found in an article on the native rubbers of the Malay Peninsula, in the *Agricultural Bulletin* of the Malay Peninsula, for May 1900.

**Barbados Blackbirds at St. Kitt's.** The Barbados blackbirds set free some years ago in this island are prospering and rapidly increasing in numbers. They keep up the same social habits as in their native island, flying about in flocks and preferring the neighbourhood of the dwelling-houses on the estates. The writer saw in August 1906 a flock of more than forty in trees near the shore on Camp estate. These birds (twenty-one in number) were first introduced on Camp estate about 1895. In 1901, about 100 birds were set free on both windward and leeward sides of the island. In 1905, fifteen were liberated at Springfield.





## SUGAR INDUSTRY.

### Bud Variation in the Sugar-cane.

Reference has already been made to the occurrence of bud varieties or 'sports' amongst sugar-canes, and in the *West Indian Bulletin* (Vol. II, pp. 216-23) a *résumé* was given of previously recorded instances, together with coloured illustrations of two different examples.

It was shown that such a phenomenon was known in widely separated countries—Mauritius, Louisiana, the West Indies, and Queensland—and that generally striped or ribbon canes gave rise to sports. Later, the relative merits of the sport canes and the original stock were put to a strictly comparative test at the Dodds Experiment Station, Barbados, and it was found that the yield from the sport cane in the experiments exceeded the yield from the original stock cane by nearly 2,000 lb. of saccharose per acre. (*West Indian Bulletin*, Vol. IV, pp. 73-4.)

The value of sport canes has also been recorded from Queensland, where it is stated that one of the seedling canes has produced a sport which gave an analysis of 19.72 per cent. saccharose, as against 19.03 per cent. saccharose of the parent cane.

In the *Agricultural Journal of India*, for October 1906, Mr. C. A. Barber, M.A., F.L.S., notes the occurrence of bud varieties in the sugar-canes under experiment at the Samalkota Sugar Station, Madras. In this instance, a cane known as 'Striped Mauritius' gave green or yellow and red sports. The green sport is hardier and bunches more readily than the parent cane but it possesses inferior juice, while the red sport is little inferior, if not superior, to the striped cane, which would appear to hold an intermediate position between the two. The author of the paper thinks that this falls in with the suggestion that the yellow varieties of sugar-canes were the first obtained and cultivated, that the assumption of the red colour came next, and that the striped canes were probably the last to arise. These may have arisen by seminal crossing and are therefore true hybrids, or they may be graft hybrids, having arisen from the apposition of two canes of different colours by natural grafting.

The tables giving the analyses of the different sports show that, whereas the red sports gave a remarkably high percentage of saccharose during the first year, the results were not so good in the second year, the yield falling below that of the parent cane, thus illustrating the need of thoroughly testing new varieties of sugar-cane before recommending them for general trial.

### The Sugar-cane in Martinique.

*La Martinique*, for November 17, 1906, begins an account of 'La canne à sucre à la Martinique,' which runs through six numbers of the paper. The following is likely to be of interest:—

In the north of Martinique there are many cane-mills driven by waterwheels, while in the south the central factories (*usines*) and the low price of sugar have put out of use the old wind-mills, mills worked by animals, and small steam-mills, the ruins of which are now covered with picturesque vegetation. The shares of the central factories were issued at 500 francs and rose to more than 1,500

francs. After the crisis in the sugar trade in 1884, the value of the shares sank, and to-day only the very best fetch as much as 200 francs, while some are as low as 10 francs. The value of sugar estates sank in the same proportion.

Besides the depreciation in price of sugar, the planters had great losses to endure from the moth borer, allied with the rind fungus (*Trichosphaeria*). This disease first made itself conspicuous in 1885, in the valley of Bassignac, on the plantations Tracée and Camille. The damage was greatest in the drier districts. It is said that nine-tenths of the canes of Martinique now contain perforations of the moth borer. The fungus causing the rind disease (*Trichosphaeria Sacchari*) lives also on pieces of rotten bamboos. The parasite of the eggs of the borer, *Trichogramma pretiosa*, is said not to have been met with in Martinique. On the other hand, the fungus, *Isaria barberi*, which attacks the larva, has been seen in the south of Martinique.

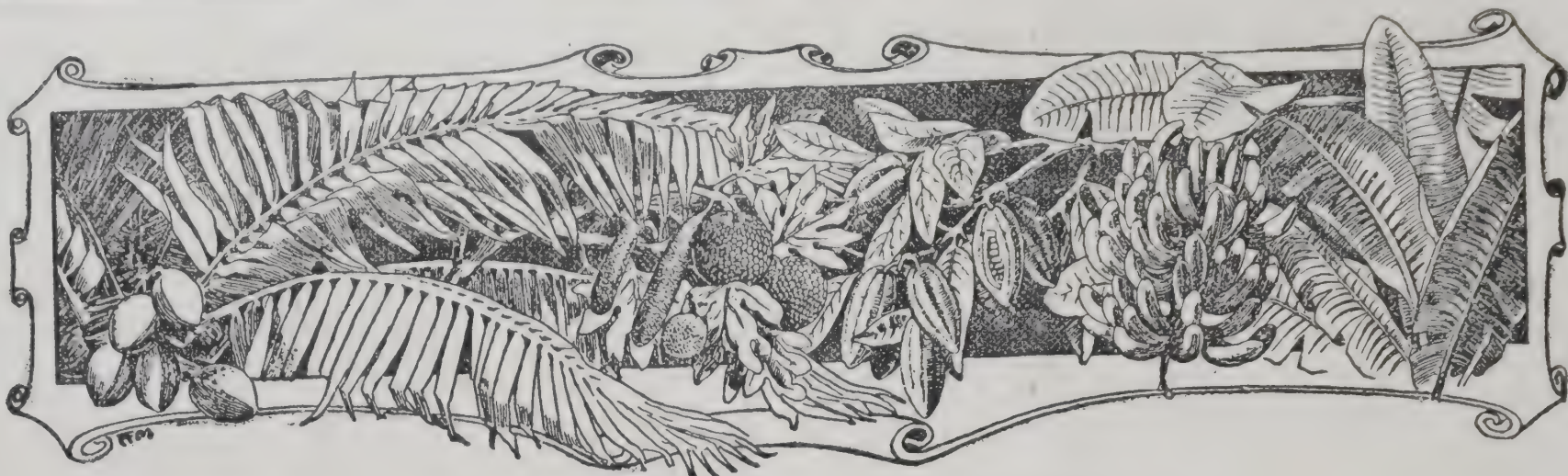
It was soon noticed that the Otaheite (Bourbon) cane was attacked the worst by the rind disease, while other canes, such as Malavois, Courbaril, and White Transparent, though pierced by the borer, were not appreciably injured by the fungus. In consequence, the cultivation of the Otaheite (Bourbon) cane was abandoned, and the fields were planted with these comparatively immune varieties. At present several seedlings raised in the British West Indies, such as, D. 78, D. 95, D. 109, B. 147, B. 208, etc., are grown, and are characterized by a juice rich in sugar, a large production of cane, and resistance to the rind disease.

More than three-quarters of the population of Martinique depend on the sugar-cane. Taxes on sugar products produce most of the revenue of the island. The sugar-cane cannot be replaced by secondary products, though they may well exist along with it.

Recommendations are made: (1) that all varieties of cane attacked by the rind disease should be replaced by newer seedlings; (2) that fields in which it appears should be burnt; (3) that the parasite, *Cordyceps barberi*, should be introduced, and *Isaria barberi* propagated; (4) that insectivorous animals like the Philippine blackbird and lizard, the dragon-fly of Réunion, the European sparrow and chaffinch, the Barbados sparrow, etc., should be introduced; (5) that the Experimental Gardens of Martinique should hybridize canes and propagate seedlings received from the English colonies; (6) that the Agricultural Department of Martinique should establish close relations with the Imperial Department of Agriculture for the British West Indies.

**Mulching Potatos.** After their spring crop of Irish potatoes has been lifted, the growers of the Southern United States usually adopt a special method if they wish to grow a second crop. The potato being a plant which requires much moisture, they conserve the soil moisture and protect it from the summer sun's heat by a thick mulch. The seed potatoes (uncut) are laid in rows on the bare soil. Then a layer, at least a foot thick, of straw, dry grass, or pine needles, etc., is put over the whole field. The potatoes, by reason of the large store of food in the tuber, can grow right through this thickness of mulch and spread out their branches and leaves above it. As no weeds can get through such a thickness, the field requires no more attention till the crop is reaped. As the young potatoes all grow between the surface of the soil and the mulch, all that is needed in reaping is to lift the latter and pick up the new potatoes from the bare soil. It is suggested that this method might perhaps be successful for growing English potatoes in certain parts of the West Indies.





## WEST INDIAN FRUIT.

### BANANAS IN THE CANARY ISLANDS.

The *Colonizer*, for December, quotes from Brown's Guide the following particulars as to the cultivation of bananas in the Canary Islands:—

Bananas in the Canaries only grow on irrigable land up to an altitude of about 8,000 feet. They are shipped more especially from Grand Canary. Land planted with bananas takes about eighteen months to come into bearing. Later on it gives fruit about once a year. The roots should be planted about 7 feet apart, in rows about 9 feet apart. This gives about 780 plants to the acre, or about 920 to the Canary fanegada. New land planted with old trunks will give fruit at from four to six months earlier than similar land planted with suckers.

The first harvest consists of one bunch to the plant, which is then cut down. In the meantime several suckers spring up. These should be reduced to not more than three. An acre of land may thus, under favourable circumstances, produce 2,340 bunches a year. At 1s. 6d. a bunch all round, not a high estimate, this gives £175 a year gross. Expenses consist of a little labour, plenty of water, and some manure (generally chemical).

The age of a plantation is probably limited to from nine to sixteen years, after which the fruit deteriorates. From its actual duration, one year and a half must be deducted. The annual result when in bearing is, therefore, rather larger than the actual mean yield. When fairly started, a banana plantation gives little trouble, but the plant is rather difficult to kill when it is necessary to clear the ground for other crops. The leaves rot slowly, but form a good manure, or they are used for packing. The stems serve as fodder for cows.

### HYBRIDIZATION OF PINE-APPLES.

The results of experiments carried out at the Experiment Station at Hope, Jamaica, up to March 31, 1904, with a view to producing improved varieties of pine-apples by hybridization, will be found by reference to the *Agricultural News*, Vol. III, p. 420.

In the *Yearbook* of the U. S. Department of Agriculture for 1905, Mr. Herbert J. Webber gives an account of the pine-apple breeding experiments carried out by that Department.

All of the known varieties of pine-apple had some fault or faults which rendered them more or less unsatisfactory. It was desirable (1) that more varieties with smooth-edged leaves should be grown, since only one variety with this character-

istic was known to the growers; (2) that more disease-resistant varieties should be obtained; (3) that the eating quality should be improved; (4) that better varieties for shipping should be produced.

The pollen used was obtained by cutting off the flowers closely with short scissors. These clipped flowers were put in small labelled bottles, until used. A fresh supply of pollen was collected each day. The process of crossing was very simple as it is unnecessary to emasculate the flowers in the bud, on account of their being, as a rule, self-sterile. For the same reason, the flower heads were not enclosed in bags.

In the process of crossing, the flowers, which scarcely open normally, were forced open slightly, in order to give easy access to the pistil. Pollination was then effected by rubbing open anthers of the desired variety over the pistil, from one to three anthers (the number depending on the abundance of the pollen present) being used on each stigma.

Four years were required for the seedling plants to reach the fruiting stage, and it is thought that the best hybrid is the Miami, obtained from Enville crossed by Smooth Cayenne.

### CULTIVATION OF THE COCOA-NUT.

In the *Tropical Agriculturist*, for October 1906, some practical facts and deductions are quoted from the studies of the biology of the cocoa-nut in the *Philippine Journal of Science*. The following are the most important:—

1. The physical characters of the soil for a cocoa-nut plantation seem almost more important than the chemical characters. There must be a porous soil with water (not stagnant) within easy reach.

2. The roots extend more than 6 feet deep and 15 feet laterally. Hence the palms should not be planted closer than 30 feet.

3. When cocoa-nut palms grow on the sandy beach much of their nutriment comes from the water which soaks down underground from the land towards the sea.

4. In selecting nuts for seed, they should be taken from a palm which bears the greatest quantity of nuts in proportion to its neighbours, not from one which bears many nuts because it is favourably situated.

5. The maximum amount of oil is found in nuts which have been stored for three months.

6. In the Philippines a small part of the husk is cut off the top of seed nuts to allow more easy egress for the shoot.



## COLONIAL FRUIT SHOW.

The sixth Show of Colonial Fruit was held under the auspices of the Royal Horticultural Society in London on December 4 and 5. The following particulars are taken from the *West India Committee Circular* :—

The West Indies were represented by the Permanent Exhibition Committee of Dominica, who were awarded the Society's gold medal for their display of citrus fruits ; the West Indian Produce Association, who received the gold medal for preserves ; the Royal Mail Steam Packet Company, who obtained a Silver-gilt Knightian medal for a general display of fruit ; the Norbrook Canning Company of Jamaica, who also received a Silver Knightian medal for canned preserves ; Mr. Muirhead, of Jamaica, and Messrs. Aston Gardner & Co., who already gained the highest award at a previous exhibition.



FIG. 1. FRUIT EXHIBIT OF THE WEST INDIAN PRODUCE ASSOCIATION.

The chief features of the Dominica stand were the navel and seedless oranges and the fresh limes, which, with other fruits of many varieties—Portugals, citrons, lemons, grape fruit, shaddocks and giant shaddocks—were set out to advantage in baskets, relieved with crotons and palms. The fruit was all in excellent condition, and in marked contrast to that received from Jamaica, the bulk of which was, unfortunately, reduced to pulp and quite useless.

The Dominica exhibit was made of practical value by the display of large, yellow posters extolling the merits of fresh limes in bold, green type, and the distribution of some hundreds of leaflets inviting visitors to ask for them and use them instead of lemons. Moreover, specimens of the fruit were freely distributed from barrels shipped by the Atlantis Fruit Company.

The West Indian Produce Association had an exhibit which covered a run of no less than 180 feet of tables, with an area of 720 square feet. The canned preserves of the Norbrook Canning Company were very favourably commented upon by the jury, who, however, were inclined to urge that in future they should be put up in glass and not in tins.

Regarding the exhibits as a whole, the jury spoke in a most encouraging strain. What pleased them most was the remarkable all-round improvement shown in the selection, the putting-up, and the display of the produce.

At the close of the exhibition the Dominica fruit, which was still in first-rate order, was re-packed and forwarded to the principal London hospitals. A box containing specimens of each of the fruits exhibited was forwarded by the West India Committee to Buckingham Palace, and the King was graciously pleased to accept it, together with copies of the literature regarding the colony.

The accompanying illustration (fig. 1), the block for which has been loaned by the Secretary of the West India Committee, shows the fruit exhibit of the West Indian Produce Association. Limes were displayed in a striking manner on a board surrounded by bamboos.

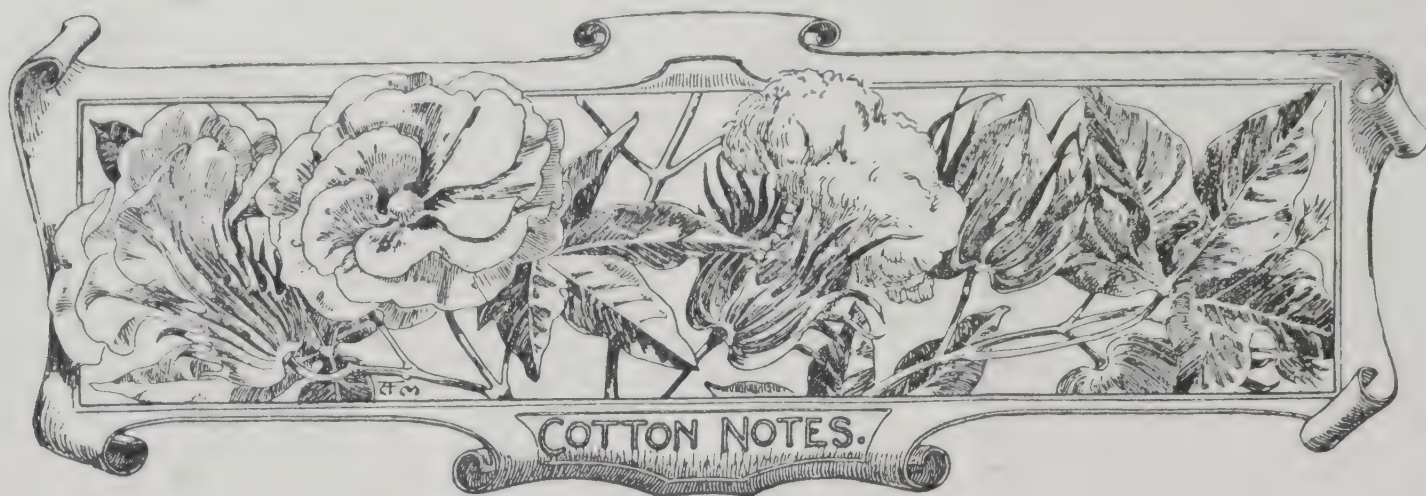
## RUBBER IN BRITISH GUIANA.

At a meeting of the Royal Agricultural Society of British Guiana, on December 18, it is stated in the *Demerara Argosy*, Dr. C. Bovallius gave an interesting address on rubber cultivation in the colony.

He pointed out that British Guiana geographically and climatically was on a parallel with the very heart of the country that was the mother-land of the best of known rubbers—that spoken of as Para rubber. The collection of wild rubber must be the foundation of an industry that would eventually see the proper planting of rubber. He spoke at some length on the methods adopted by the Indians for tapping the trees and preparing the rubber for sale, and he named the species that he considered most suitable for cultivation in this colony. Referring to the north-west district, Dr. Bovallius said that the rubber was so scattered about the land that it could not be described as a rich rubber land suitable for the exploitation of wild rubber on a large scale ; but it seemed to be a very promising field for small plantations, especially for coolies who could combine rice cultivation in the lower portions with rubber planting on the higher points.

For such plantations the species of the genus *Sapium* now growing in the district should be used. In the lowlands below Arakaka there was no place where *Hevea brasiliensis* could be safely planted, and *Castilloa* only on the very few hills that existed in the lower river region. He thought that along the banks of the Essequibo above Bartica, along the Cuyuni and Mazaruni, and in many places on the Upper Demerara river, large plantations of *Hevea brasiliensis* and *Castilloa elastica* would be successfully carried on. Still, he believed that even there the indigenous species of *Sapium* would prove fully as profitable and much less expensive. Some species of rubber-producing *Sapiums* seem to be extremely hardy and quick growing, and ought to give a good return two or three years earlier than *Castilloas* and three or four years earlier than *Hevea*. Rubber trees should not be planted as low as the sea-level but where they could have 6 or 7 feet of firm soil under them.





## INSURANCE OF COTTON SHIPMENTS.

The following is a further communication from the Secretary of the British Cotton-growing Association on the subject of the insurance of cotton shipments from the West Indies. The previous letter was published in the *Agricultural News*, Vol. V, p. 390:—

We find, on referring to our previous letters to you on the above matter, that we have omitted to inform you that on the Insurance Company's contract cover there is a clause which states that the risk of fire while in the Steamship Company's warehouse awaiting shipment, for a period not exceeding thirty days, is included in the policy. This, we have no doubt, will be of convenience to some of the cotton planters who are unable to store their cotton in their own warehouse pending shipment.

## SEA ISLAND COTTON MARKET.

The 'Sea Island Cotton Report' of Messrs. Henry W. Frost & Co., of Charleston and Savannah, dated December 22, 1906, has the following reference to Islands cotton:—

There has continued a good demand for the moderate offerings of odd bags at 34c. for fine, 38c. for fully fine, and 40c. for extra fine, and the market is firm at these prices. The sales were largely composed of crop lots at from 40c. to 50c., for which factors continue to hold for their asking prices.

It is generally reported that the percentage of cotton to be ginned this year is much smaller than in any of the previous years, but, as the amount already ginned is larger than was expected, crop estimates now range from 55,000 to 60,000 bales.

## PRUNING COTTON PLANTS.

Pruning cotton plants after the first bearing has been tried by a number of planters in Barbados, but up to the present, it has not been considered advisable to give a general recommendation to that effect.

Barbados being free from the leaf blister-mite, it is possible to obtain a second bearing, which sometimes proves to be very valuable. In islands where the leaf blister-mite has appeared, this is not possible, and there plants should be taken up as soon as the first bearing has been picked.

The pruning of cotton plants in Barbados is likely to prove of importance in the future, in view of the fact that the red maggot may possibly have to be fought in this direction.

Attention might be drawn to an article in the *Agricultural News*, Vol. V, p. 389, entitled 'Mulching in Dry Weather.' In Egypt it has been found that during the hot months plots which were kept broken to a depth of 2 inches retained, three and four weeks after watering, between 27 and 36 tons more water per acre in the first foot of soil than the unbroken plots.

During the period of growth after the first bearing has been picked, the cotton plants have to pass through a very dry period. The months of January, February, and March are usually very dry, and this is the period when the growth which gives the second bearing takes place, and when the plants require a liberal supply of moisture to give the best results. Unfortunately, the cotton fields during this dry season usually present a very neglected appearance, the surface layer of soil becoming dry and caked. This causes a great loss of moisture, which might be avoided if the surface soil were kept in a loose condition.

Pruning here becomes important, for otherwise it is very difficult to do any work in the field with a hoe without damaging the plants.

Pruning is also likely to be of service in combating the red maggot. If the infected parts of plants are allowed to remain untouched, the maggots will develop to their mature stage, and then escape to infest other plants in the neighbourhood. By pruning plants seen to be infected, and pruning fields generally after the first bearing, and burning the parts cut away, it may be possible to check the progress of this pest. Always prune below the wound which indicates the situation of the maggots in the stem.

In any case no damage is done to the plants by pruning them, and it gives the planter a chance to till his soil, and thus conserve the moisture during the dry season.

## IMPROVEMENT OF STOCK AT ST. LUCIA.

The St. Lucia Agricultural Society has voted a premium of £10 for the importation of a pure-bred Hereford, Jersey, or South Devon bull, on the following conditions:—

- (1) The importer is to notify the Society of his intention to import such a bull.
- (2) The approval will be made by two members appointed by the Managing Committee.
- (3) The bull is not to be over three years.
- (4) The bull is to be available to the public at a maximum fee of 5s.
- (5) The importer is to give a written promise not to remove the animal before three years from the colony.
- (6) The premium will only be granted three months after the importation.

The Society also voted a premium of £25 to the importer of a pure-bred Maltese jack.



## SOME DISEASES OF PALMS.

In an article on fungus diseases of palms, in the *Agricultural Journal of India*, Vol I, part 4, Mr. E. J. Butler, M.B., F.L.S., states that such troubles are rare, but that a few have appeared in India in recent years and, while due to different causes, agree in their general effects.

A black rot of betel-nut palms (*Areca Catechu*) in Mysore causes a number of flowers to fall without setting fruits, and their stalks to blacken and putrify. Later, the leaf-sheaths become affected near the point of origin of the flower-stalk, and a patch of rot makes its appearance at this point and may spread to the growing bud, after which the whole head withers and falls off.

This rot is caused by a species of *Phytophthora* and is hastened by wet weather. It is suggested that the spread of the disease has been increased by the earlier harvesting of the nuts, which may indicate a change in habit of the tree or the introduction of an earlier variety. The remedial measures recommended, therefore, are to revert, if possible, to the late harvested crop of former years or to cover the bunches of fruit effectively, by the introduction of tin covers, during the wet months.

A root disease of betel-nut palms, caused by a *Hymenomyces* fungus, occurs in Sylhet and in some instances has caused the death of fifteen-sixteenths of the total number of trees. In plantations where portions are still free from the malady, trenches should be dug to isolate these areas from the diseased parts of the estate, but it is essential that such trenching should be undertaken as soon as the disease appears. All dead or dying trees should be destroyed, preferably by fire.

A disease amongst palmyra palms (*Borassus flabellifer*) was noticed in Godavari in 1897, and has received attention during the last two or three years, on account of its rapid spread. The earliest sign of the disease is the etiolation of the central leaves. These eventually wither, as do many others; the central bud becomes diseased, and the palm dies. The stem and root appear to be perfectly healthy, and therefore the cause of the disease must be sought for at the crown of the tree. A species of *Pythium* is said to cause this disease, commencing in the leaf-sheaths and penetrating to the central bud.

Cocoa-nut palms are undoubtedly subject to infection, and therefore strong recommendations are made for the stamping out of the trouble before it assumes alarming proportions. When cocoa-nut palms are attacked they closely resemble the 'bud-rot' of cocoa-nut palms, which is attracting attention in the West Indies at the present time. Destruction of all diseased buds is strongly recommended, and it is also pointed out that infection of healthy trees can be guarded against by spraying the leaf-sheaths with Bordeaux mixture. Such recommendations to be effective must be carried out systematically and by co-operation amongst the cultivators, for it is useless to remove the source of infection in one plantation, if diseased trees are allowed to remain in neighbouring fields to convey infection back again. The similarity between this disease and the 'bud-rot' of cocoa-nut palms is striking, although different causes have been provisionally assigned for them, and the suggested remedial measures are the same in both cases, viz., 'stamp out' (by destruction of all diseased material) and sterilize healthy trees in the neighbourhood of infected trees. (*Agricultural News*, Vol. IV, pp. 299 and 370.)

## RABBIT KEEPING.

The Royal Society for the Prevention of Cruelty to Animals has issued the following leaflet containing hints on rabbit keeping:—

When about to keep these pets, you must not think that any old box will do for a hutch, for boxes that are badly put together, or made of thin boards, will not do at all. First, as to size. Buy a nice sound box not less than 2 feet square, and it might be even larger with advantage; in fact, it must be larger if required for breeding purposes. The drainage of the box must be attended to. Place it on a stage, slightly sloping from the front; and at the back of the box make a number of small holes. Each hutch should have two compartments, one of which should be open at the front with wire, and there should be two wide doors. Let hutches be at least a foot from the ground, and do not place one above the other. Let them also be where sunshine can reach them. Give an abundance of clean, dry bedding.

As it is necessary to keep your pets warm and dry, you should have a good thick covering to put over the wire front of the hut in winter and wet weather, but be careful not to exclude the air entirely.

Regularity in feeding is very important, both as to hours and as to the quantity of food given. You must have a fixed feeding time; then you will be less likely to forget the helpless creatures dependent on you. The morning meal should never be given later than 8 o'clock; never feed them at noon, as that is the time for rest and sleep; the second meal should be given about sunset, and this is the principal meal, as rabbits eat with the greatest appetite during the night. You may give them turnips and other root vegetables, oats, peas, beans, pollard, meal, bran, and acorns. Then, in green food they will eat almost anything, but the best to give are cabbage, lettuce, spinach, clover, milk-thistle, and dandelion leaves. Apples and pears, or the peel of these, they are very fond of. Fresh green grass is very good for them, also carrot and turnip tops, and potato parings. Do not give wet green food; after heavy rain the green vegetables should be well shaken and dried; they must never be fed entirely on bran and corn. As a rule, rabbits do not require as much drink as many animals, but water should be kept within their reach, especially when there is a scarcity of green food.

You should often give your rabbits the pleasure of a scamper. Exercise is very beneficial to them, and also a great delight, keeping them in a healthy and happy condition. If they are allowed to run on an open piece of grass, they must be watched lest they should stray; but they seldom run off, and are easily caught again if gently approached. Do not let them run on grass that is wet with dew or rain; the main point is to give them exercise; therefore, a yard, or any enclosed space, will answer the purpose, and an hour's run, twice in the week, will do them a world of good.

In lifting your rabbits to and from the hutch, grasp both ears firmly with one hand, and with the other support the hind quarters.

For the English foods mentioned above, the rabbit keeper in the West Indies will have to substitute such readily available foods as sweet potato vines, any of the common grasses, Guinea corn stalks and leaves, boiled yam, etc., etc. A useful series of articles on rabbit keeping in the West Indies was commenced in the *Agricultural News*, Vol. III, p. 230; special reference might be made to that on feeding (p. 278).



## EDITORIAL NOTICES.

Letters and matter for publication, as well as all specimens for naming, should be addressed to the Commissioner, Imperial Department of Agriculture, Barbados.

All applications for copies of the 'Agricultural News' should be addressed to the Agents, and not to the Department.

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## Agricultural News

VOL. VI. SATURDAY, JANUARY 12, 1907. No. 123.

### NOTES AND COMMENTS.

#### Contents of Present Issue.

Proposals relative to the visit of the Canadian Trade Delegation to the West Indies are discussed in the editorial. The Delegation will leave Halifax in S.S. 'Olenda' on February 15.

On p. 3. will be found a note on bud variation in the sugar-cane and an account of the cultivation of the sugar-cane in Martinique.

At the Colonial Fruit Show, held in London recently, the exhibit of citrus fruit by the Dominica Permanent Exhibition Committee was awarded a gold medal. (p. 5.)

The note on some fungus diseases of palms is of interest, in view of the trouble caused by the 'bud-rot' of cocoa-nut palms in the West Indies. (p. 7.)

A list of the Representatives appointed to attend the West Indian Agricultural Conference at Jamaica, and a provisional programme of the proceedings, are published on pp. 10-11.

The Insect Notes (p. 13) contain an account of the sugar-cane beetle of the United States, and a note on recent anti-malaria work.

On p. 14 will be found an interesting review of the position of agricultural affairs in St. Lucia.

Sugar planters and merchants in the West Indies will be interested in the extracts from the new Canadian tariff published on p. 15.

#### Citrate of Lime from Seychelles.

In view of the increasing production of citrate of lime in Dominica and Montserrat, it is interesting to note that a sample of this product from the Seychelles was recently examined at the Imperial Institute.

It was found to contain 84.56 per cent. of citrate of lime; it was of good quality, containing very little mucilaginous or colouring matter. The amount of iron oxide was, however, rather high, and this was its chief defect, but can be easily remedied in future by carefully selecting the chalk used for neutralizing the juice.

The present value of citrate of lime is £70 per ton. This is a higher figure than has prevailed for some time, the normal value being £45 per ton delivered in London.

Professor Dunstan emphasizes the need of avoiding the presence of iron, and of thoroughly drying the citrate before shipping it in bulk, as the effect of any dampness is to permit fermentation.

A note on the shipment of citrate of lime from Dominica appeared in the *Agricultural News*, Vol. V, p. 324. The subject of the manufacture of this product will be discussed at the forthcoming West Indian Agricultural Conference.

#### Cacao in St. Vincent.

Mr. W. N. Sands, Agricultural Superintendent at St. Vincent, read a paper on the cacao industry, before the Agricultural Society, on December 4.

The hurricane of 1898 had severely checked the culture of cacao in their island. In 1897, £4,514 worth was exported, in 1899 only £116 worth. Now many thousands of young trees are growing up, and the exports were valued at £2,423. St. Vincent had a very light soil, and hence cacao would suffer in the dry season, unless planted in sheltered places with a deep, rich soil and good rainfall. At high elevations in St. Vincent, cacao was much attacked by fungoid diseases and beetles. Most high mountain plantations he had seen had failed. Where the volcanic ash was cleared away after the eruption around cacao trees, they did well, as at Mount Bentinck estate; but where the ash was allowed to remain, the surface roots were killed and the trees badly attacked by thrips.

The variety of cacao recommended for St. Vincent was the Forastero, locally known as Caracas cacao. This was the only variety which had been distributed from the Botanic Station. It was important that all the trees on an estate should be of the same variety, as an even sample commanded a higher price than a mixture of large and small beans of different characteristics.

A new shade tree for St. Vincent was the Madura. Castilleja rubber was also recommended.

A small night-flying beetle, beetle grubs, mole-crickets, and thrips were the chief insect enemies of cacao in St. Vincent. The best way of preventing damage from the last-mentioned was to keep the plantation in a healthy condition. Black pod disease, caused by *Phytophthora omnivora*, would be kept in check by destroying diseased pods.



## Rubber in Hawaii.

From the second report of the Board of Commissioners of Agriculture and Forestry of the territory of Hawaii, we learn that there are now three organized rubber companies planting trees on the windward coast of Maui. The Ceara rubber has done the best so far and grows the quickest. About 14 lb. of the seed have been distributed. Out of 4,000 *Castilloa* seeds brought from Mexico, only one or two have yet germinated. Twenty-five *Castilloa* trees from Mexico have been planted at an elevation of 400 feet with a view to propagation by cuttings.

## Agriculture in the Canary Islands.

In the course of an interesting account, in the *Colonizer*, for December, of a visit to the Canary Islands, reference is made to the agricultural resources of the islands.

From 1840 to the end of the eighties, cochineal was the chief source of wealth, the exports of this article, in 1869, being 6,076,869 lb., valued at over £750,000. On the discovery of aniline dyes in 1879, the cochineal boom completely collapsed, leaving behind it wide-spread misery and ruin.

A great deal of land had, however, been irrigated and brought under cultivation, which made it easier to replace the former cultivation by the now flourishing and permanent fruit and vegetable industry. It was largely due to Sir Alfred Jones that the great potentialities in this direction were first prominently brought to home attention.

The profitable results from banana cultivation are high. Under favourable circumstances, an acre of land may produce 2,340 bunches a year; at 1s. 6d. a bunch all round, this gives a gross return of £175 a year.

Other important exports are potatoes, tomatoes, sugar, and wine, while the trade in native handicrafts is greatly increasing.

Goats are kept for milk and cheese, which provide an important portion of the people's diet. Mules do practically all the estate work.

## Sale of Unsweated Cacao.

A correspondent draws attention in the *Grenada Chronicle* to the harm being done to the cacao industry by the sale of unsweated cacao. Many of the small holders, having no conveniences for the proper curing of their cacao, simply wash off the mucilaginous matter, expose the beans to the sun for a few hours, and then dispose of them to some licensed cacao dealer, who completes the drying process and ships the product. Such inferior cacao realizes nearly £1 a bag less than estates' cacao which is properly handled.

The remedies proposed by this gentleman are: first, that the Cacao and Nutmegs Ordinance should be so amended as to prevent the sale of wet cacao; secondly, that proprietors of well-equipped estates should buy cacao from the surrounding peasantry immediately it is picked. This would cause the product of the colony to be more uniform in quality and, consequently, to command a better price.

Further, it is suggested that the Agricultural Society should do all in its power to impress upon the peasants the harm they are doing to themselves, and to the colony in general, by offering for sale unwashed cacao.

## Limes in British Guiana.

The *Demerara Argosy* of December 15, 1906, contains a report of a journey of Mr. W. L. Bennett through Demerara, in search of land suitable for lime cultivation. The report is written by Mr. R. Ward, Agricultural Instructor, who accompanied Mr. Bennett.

The latter had been sent from England by Messrs. Harvey, Lockie & Co., London, to find a suitable site for a lime plantation in the West India Islands or in British Guiana. He had first visited, with this object, Montserrat, Dominica, St. Lucia, and Trinidad.

The party went up the Demerara river, and to Bartica. At the last place there were yellow loamy clays and tracts of sandy loam with yellow subsoil. This place was decided upon as the best site for a lime plantation, and Mr. Bennett returned to England to report in favour of British Guiana as having the best land for limes.

Mr. Ward ascertained that in the stiff coast-lands lime plants were apt to die off suddenly, and were very liable to the attacks of insect pests; whereas, on the more porous and naturally drained lands, the trees grew to a large size, and were not nearly so liable to such attacks.

Samples of limes were taken from the districts visited, and the juice tested for citric acid. Those from Suddie gave 13.4 oz. per gallon; those from Demerara river and Wallaba Quarrie, 10.8 oz., and those from Greenheart Camp and Bartica, 12 oz.

## Cacao in Bahia.

In the *West India Committee Circular*, November 20, 1906, a report is published from the British Consul at Bahia, who states that cacao is grown in that state on low ground or on slopes near rivers, at distances of 8 to 13 feet in parallel lines. When first planted the trees are shaded by bananas; they flower in January for the first crop, and continue until July for the second or principal crop. The variety called Para cacao has the smallest bean, while the largest kind is the Maranhao. The crop is marketed from April to December.

The beans are allowed to ferment for three to five days, and are then usually exposed to the sun. If a stove is used, the wooden trays run on rails to the stove, in case of rain. The beans are dried for five or six days, when, if dry enough, they are bagged in sacks of 132 lb. each for shipment to Bahia, to be exported. Very few stoves for drying are used and their employment should become more general. By far the greater quantity of Bahia cacao does not obtain the highest prices owing to its being of inferior quality. In 1905-6, about 42,000,000 lb. were exported, and the production seems to be slowly increasing. The exports during 1905 went to Germany, United States, France, Holland, and Great Britain, etc., in order of value.



## WEST INDIAN AGRICULTURAL CONFERENCE, 1907.

The following is a list of Representatives appointed to attend the Agricultural Conference at Jamaica, January 11 to January 17, 1907:—

### President.

The Hon. Sir Daniel Morris, K.C.M.G., M.A., D.C.L., D.Sc., F.L.S., Imperial Commissioner of Agriculture for the West Indies.

### Representatives.

#### JAMAICA.

The members of the Board of Agriculture and the Board of Management of the Jamaica Agricultural Society.

#### BRITISH GUIANA.

The Representative of the Board of Agriculture (The Hon. B. Howell Jones.)

The Agricultural Superintendent (Robert Ward, Esq.)

The Inspector of Schools (H. W. Sconce, Esq., M.A.)

#### TRINIDAD AND TOBAGO.

The Representative of the Trinidad Agricultural Society: The Hon. Carl deVerteuil (Cacao Industry).

The Government Analyst and Professor of Chemistry (Professor P. Carmody, F.I.C., F.C.S.)

The Superintendent of the Royal Botanic Gardens (J. H. Hart, Esq., F.L.S.)

#### WINDWARD ISLANDS.

The Agricultural Superintendent, Grenada (R. D. Anstead, Esq., B.A.)

The Agricultural Superintendent, St. Vincent (W. N. Sands, Esq.)

The Agricultural Superintendent, St. Lucia (J. C. Moore, Esq.)

The Inspector of Schools, St. Lucia (The Hon. C. F. Condell.)

The Representative of the St. Lucia Agricultural Society (Henry G. Grist, Esq.)

#### BARBADOS.

The President of the Education Board: His Lordship the Bishop of Barbados (The Right Revd. W. P. Swaby, D.D.)

The Agricultural Superintendent of Sugar-cane Experiments (J. R. Bovell, Esq., F.L.S., F.C.S.)

The Representatives of the Barbados Agricultural Society: The Hon. F. J. Clarke, M.A. (President), G. Elliott Sealy, Esq., M.C.P., T. W. B. O'Neal, Esq., M.C.P.

Additional Representative for Barbados: George Carrington, Esq., B.A. (Cantab.), F.C.S.

#### LEEWARD ISLANDS.

The Representative for the Colony of the Leeward Islands (The Hon. E. St. John Branch, Colonial Secretary.)

The Government Analytical Chemist and Superintendent of Agriculture (The Hon. Francis Watts, C.M.G., D.Sc., F.I.C., F.C.S.)

The Curator, Botanic Station, Dominica (J. Jones, Esq.)

The Agricultural Superintendent, St. Kitt's-Nevis (F. R. Shepherd, Esq.)

The Representative of the Dominica Agricultural Society (S. W. Penrice, Esq.)

The Representatives of the Dominica Planters' Association: The Hon. J. C. Macintyre, M.E.C., J. Cox Fillan, Esq., M.L.C.

### OFFICERS OF THE IMPERIAL DEPARTMENT OF AGRICULTURE FOR THE WEST INDIES.

The Imperial Commissioner of Agriculture for the West Indies (The Hon. Sir Daniel Morris, K.C.M.G., M.A., D.C.L., D.Sc., F.L.S.)

Entomologist (Henry A. Ballou, Esq., M.Sc.)

Mycologist and Agricultural Lecturer (F. A. Stockdale, Esq., B.A.)

Honorary Secretary to the Conference: Alleyne Graham Howell, Esq.

### Programme of Proceedings.

The following is a preliminary programme of the subjects to be brought forward and discussed at the Conference:—

#### SUGAR INDUSTRY.

I. Seedling Sugar-canes in Jamaica. (Mr. H. H. Cousins, M.A., F.C.S.)

II. The Rational Use of Fertilizers for Sugar-cane in Jamaica. (Mr. H. H. Cousins, M.A., F.C.S.)

III. Jamaica Rum. (Mr. H. H. Cousins, M.A., F.C.S.)

IV. High Ether Process and Rum Making in Jamaica. (Mr. Joseph Shore.)

V. Results of Recent Experiments with Seedling and other Canes in the Leeward Islands. (The Hon. Francis Watts, C.M.G., D.Sc., F.C.S.)

VI. Summary of Results of Experiments with Seedling and other Canes at Barbados. (Mr. John R. Bovell, F.L.S., F.C.S.)

VI. a. Breeding Hybrid Sugar-canes. (Mr. F. A. Stockdale, B.A.)

VII. Selective Cane Reaping at Jamaica. (Mr. A. Charley.)

VIII. Some Points in connexion with Mechanical Tillage. (The Hon. Francis Watts, C.M.G., D.Sc., F.C.S.)

IX. Soil Organisms and the Nitrogen Cycle. (Mr. S. F. Ashby.)

#### CACAO INDUSTRY.

X. Results of Plot Experiments with Cacao Trees at Dominica, St. Lucia, and Grenada. (Mr. Joseph Jones, Mr. J. C. Moore, and Mr. Rudolph D. Anstead, B.A.)

XI. Attacks of 'Thrips' on Cacao Trees in the Windward and Leeward Islands. (Mr. H. A. Ballou, M.Sc.)

XII. The 'Witch Broom' disease of Cacao Trees in Surinam. (Dr. C. J. Van Hall.)

XIII. Results of Curing Cacao by means of the Gordon 'Cacao Dryer' at Grenada. (The Hon. D. S. deFreitas.)

#### FRUIT INDUSTRY.

XIV. Suggestions for handling Citrus Fruits for Export. (Mr. H. G. Sturridge.)

XV. How to encourage Orange Trees to bear early. (The Hon. Thomas H. Sharp.)

XVI. The Cultivation and Treatment of Pine-apples. (Mr. G. L. Lucas.)

XVII. The Diseases of Pine-apples. (Mr. F. A. Stockdale, B.A.)



## LIME JUICE INDUSTRY.

XVIII. The Manufacture of Commercial Citrate of Lime. (The Hon. Francis Watts, C.M.G., D.Sc., F.C.S.)

## COTTON INDUSTRY.

XIX. Recent Results in the Cultivation of Sea Island Cotton at Barbados. (Mr. John R. Bovell, F.L.S., F.C.S.)

XX. Sea Island Cotton Cultivation in the Leeward Islands. (The Hon. Francis Watts, C.M.G., D.Sc., F.C.S.)

XXI. Sea Island Cotton Cultivation at St. Vincent. (Mr. W. N. Sands.)

## RICE INDUSTRY.

XXII. The present Position and Prospects of the Rice Industry in British Guiana. (The Hon. B. Howell Jones.)

## RUBBER INDUSTRY.

XXIII. The Cultivation of Rubber Trees in Trinidad and Tobago. (Mr. J. H. Hart, F.L.S.)

XXIV. Summary of Results of tapping Rubber Trees at Dominica and St. Lucia. (Mr. Joseph Jones and Mr. J. C. Moore.)

XXV. The Prospects of the Rubber Industry in British Guiana. (The Hon. B. Howell Jones.)

XXVI. The Cultivation of Rubber Trees in Jamaica. (The Hon. Thomas H. Sharp.)

## TOBACCO INDUSTRY.

XXVII. Tobacco in Jamaica. (The Hon. William Fawcett, B.Sc., F.L.S.)

## ANIMAL INDUSTRY.

XXVIII. Indian Cattle in Jamaica. (Mr. Beresford S. Gosset.)

XXIX. Buffalos on Sugar Estates in Trinidad. (The Hon. Samuel Henderson.)

XXX. Dairying in Jamaica. (Mr. Lionel Kerr and Mr. T. P. Leyden.)

## AGRICULTURAL CREDIT AND LOAN BANKS.

XXXI. Agricultural Credit. (His Honour P. C. Cork, C.M.G., Administrator of St. Lucia.)

XXXII. An Agricultural Loan Bank in operation. (The Revd. Dr. Turner, Jamaica.)

## MISCELLANEOUS.

XXXIII. Tea Growing in Jamaica. (The Hon. H. E. Cox.)

XXXIV. The Industrial Prospects of Cassava Starch. (Mr. H. H. Cousins, M.A., F.C.S.)

XXXV. Cultivation and Preparation of Jamaica Ginger. (Mr. R. J. Miller.)

XXXVI. The practical working of a Prize Holdings Scheme in Jamaica. (Mr. William Cradwick.)

XXXVII. The Timbers of Jamaica. (Mr. William Harris, F.L.S.)

XXXVIII. The Divi-divi tree and its Products. (Mr. W. Versluys, Curaçoa.)

## AGRICULTURAL EDUCATION.

XXXIX. Agricultural Education in Secondary Schools and Colleges in the West Indies. (Discussion.)

XL. Agricultural Education in Elementary Schools in the West Indies. (Discussion.)

XLI. The School Garden as an Educational Medium. (Mr. P. W. Murray.)

## Excursions.

The following is an outline of the programme which has been drawn up by the Reception Committee, of which the Hon. H. Clarence Bourne, C.M.G., is Chairman:—

*Thursday, January 10.*—Landing of members at Jamaica. Drive to hotels.

*Friday, 11.*—Excursions to Vere, to Spanish Town and neighbourhood, to Montpelier, to Silver Hill, to Whitfield Hall, to Buff Bay, to Castleton, to Port Antonio (if tourist train running), to Norbrook, to Hope Gardens.

*Saturday, 12.*—Excursions to Mandeville, to Silver Hill, to Shettlewood, and Knockalava, to Park, to Orange Bay and Port Antonio, to Port Antonio direct (if tourist train running), to Castleton, to Norbrook and Hope Gardens. Reception by his Excellency the Governor and Lady Swettenham in the afternoon.



SIR DANIEL MORRIS, K.C.M.G., D.Sc., D.C.L., M.A., F.L.S.,  
President of the West Indian Agricultural Conference.

*Sunday, 13.*—Service at Parish Church, Kingston. The Ven. Archdeacon Downer. Sermon to be preached by his Grace the Archbishop of the West Indies.—Excursions to Port Antonio, to Castleton.

*Monday, 14.*—Morning—Opening of Conference at Collegiate Hall by his Excellency Sir J. A. Swettenham, K.C.M.G. Address by the President, Sir D. Morris, K.C.M.G. Afternoon—Reading of papers and discussions.

*Tuesday, 15.*—Morning and afternoon—Reading of papers and discussions. Evening—Conference dinner.

*Wednesday, 16.*—Morning and afternoon—Reading of papers and discussions. Evening—Ball given by his Excellency the Governor and Lady Swettenham.

*Thursday, 17.*—Morning—Final meeting of Conference. Afternoon—Departure of members.





## GLEANINGS.

During the quarter ended June 30, 1906, the sum of £35 14s. 1d. was expended by the Government of Barbados under the provisions of the Mongoose Destruction Act.

Mr. G. S. Hudson has made the first shipment of rubber from St. Lucia. The shipment consisted of 39½ lb. from ninety-nine *Castilloa* trees from eight to twelve years old.

The *Blue Book* on Grenada for 1905 states: 'The application of manure to cacao cultivation is still on the increase throughout the island, and the drying of that product by artificial means, instead of relying upon sunlight, has been adopted on several estates.'

The annual Agricultural Exhibition was held at the Experiment Station, Tortola, Virgin Islands, in October last. The entries showed a considerable falling off in point of numbers, being but 357 as compared with over 800 last year. The quality of the exhibits was, however, mostly good. The cotton was really good.

According to the report on the Lands and Mines Department, British Guiana, for 1905-6, the output of gold during the year was 94,363 oz., as against 95,864 oz. in 1904-5. The amount of diamonds declared at this Department during the year was 65,752, weighing 4,097 carats, as compared with 10,619 carats last year.

The *West India Committee Circular* suggests that a sum of £50 to £100 should be placed on the estimates of the various West Indian Colonies in order to enable the Permanent Exhibition Committees, which have now been established in practically all the islands, adequately to carry out the work entrusted to them.

Escaped swarms of honey bees usually hive in a hollow tree or some similar cavity, but in warm countries, swarms, which apparently have not succeeded in finding a suitable hollow, occasionally build combs hanging from the branch of a tree. Such an exposed comb from California is figured in Root's *A. B. C. of Bee Keeping*. A number of larger combs than this were built in St Kitt's, a year or so ago, below a large limb of a sandbox tree.

In *La Tribune Horticole*, November 24, 1906, M. F. Lambeau, Vice-president of the Royal Linnean Society of Belgium, states that he has grown epiphytic orchids in leaf-mould with better results than are usually obtained with sphagnum. He has also used neutral chemical manures with good results. Since the air-roots of nearly all epiphytic orchids have a mycelial mantle, he is not yet in a position to state whether this fungus utilizes the nitrogen of the air or whether the orchids can utilize nitrogenous manures.

The exports of sisal hemp from Mexico in the year 1905-6 were of the value of £2,943,732, or £4,819 more than in the previous year. Those of ixtle hemp (from another species of *Agave*) show an increase of £17,217, their value being £366,784. (*Consular Report*.)

A meeting of the representatives of sugar estate proprietors and of the cane farmers in the Savanna Grande and Naparima districts of Trinidad was held at Princes' Town on December 12, 1906, when several important matters in connexion with the future of the cane-farming industry were discussed.

In the course of a speech at a dinner of the West Indian Club on December 12, the Hon. Ralph Williams, C.M.G., the new Governor of the Windward Islands, referring to the Imperial Department of Agriculture said: 'he believed that it had proved to be one of the greatest factors towards furthering the prosperity of the West Indies; but he emphasized the importance of the colonies taking upon themselves some part of the burden of maintaining the Department.'

A circular has been received from the Fuller & Johnson Manufacturing Company, of Madison, Wisconsin, U.S.A., drawing attention to their 'Bemis Tobacco Transplanter.' With this machine water is placed at the roots of the plants when they are set out, so that transplanting can be successfully done in the driest weather. All plants are properly set, thereby giving a uniform stand. It is stated that 40,000 of them are in use throughout the United States and foreign countries.

Considerable attention continued to be paid to the oil-bearing lands of Trinidad during 1905-6, a further report by the Government Geologist having disclosed the evidence of specially promising conditions in the south-western portion of the island. The attention of experts has been directed to the matter, and concessions have been already applied for, and in one case granted, under conditions by which the question of the value of the Trinidad oil field will be settled at an early date. (*Annual Colonial Report*.)

The Superintendent of Public Instruction fixed November 3, 1905, as the first Arbor Day for the 154 public schools of the territory of Hawaii. The Governor then issued a proclamation officially setting apart the day and recommending its observance. He also offered to provide half of a fund to enable a prize of £1 to be given in each school for the tree which should be found best cared for at the end of the year. The Government Nursery furnished 3,554 trees free, 2,846 of which were used by the public schools in the observance of this day.

The Chief of the Bureau of Soils of the U. S. Department of Agriculture writes that from the sheath of the new leaf of the royal palm (*Oreodoxa regia*) a kind of rope was, up to a few years ago, imported from Cuba by the tobacco warehousemen of the Gulf States, which they used for packing their cigar leaf tobacco in. The Cuban Government has now prohibited the exportation of this material, and the Department, which is looking for new sources of it, is desirous of ascertaining whether it could be obtained from the British West Indies. The number of royal palms in these islands is so limited that it is unlikely that an appreciable quantity of the leaf-sheaths could be obtained.





## INSECT NOTES.

### Sugar-Cane Beetle in the United States.

The sugar-cane beetle (*Ligyris rugiceps*) of the United States is closely related to the hardback of the West Indies (*Ligyris tumulosus*), and the account of the former given in Bulletin 54 of the Bureau of Entomology of the U. S. Department of Agriculture is of interest to sugar planters of the West Indies. The following is extracted:—

*Ligyris rugiceps* has long been known in the southern United States as a pest of cane and corn and in some years has been the cause of serious damage to these crops. The adult beetle eats into the base of the cane plant, apparently with the object of causing the plant to die, and then burrows down along the side of the cane in the soil and deposits an egg. The eggs hatch in a few days, varying from six to fifteen, and when the larva is twenty-four hours old it begins to feed. The larvae feed on the dead or dying roots and stems, and pupate in the soil. The damage is done then by the adult female beetle in eating into the stems for the purpose of killing the plant so that the larva may have dead or dying tissues on which to feed. Only one egg is usually deposited to each cut, although in a few cases several were found.

The remedies suggested are entirely cultural, such as clean cultivation of headlands, frequent tillage, and the burning of trash after cutting the crop, all of which tend to destroy hiding places for the adult beetles and feeding places of the larvae. Groups of children are also paid to follow the hoe gangs and the ploughs and collect the grubs and beetles.

The hardback has not been so thoroughly studied as to its methods. It is generally stated to feed on dead or decaying vegetable matter in the soil, but it has not been recorded as systematically cutting into canes to kill them and thus provide the necessary conditions for the larvae, like its near relative.

It has been found in the Southern States that other species of beetles are frequently associated with the *Ligyris*, among which is *Cyclocephala immaculata*. This is closely related to *Ligyris* and is represented in the West Indies by several species, one of which may be the same as the American species, *C. immaculata*. It is not nearly so common as the hardback, although it is known in most of the Lesser Antilles.

If the hardback should become a serious pest to cane cultivation in the West Indies, these remedies would probably prove efficient.

### Recent Important Anti-malaria Work.

*Science*, for December 7, 1906, contains an article on recent anti-malaria work, by Dr. L. O. Howard.

From the figures he quotes, it seems that a disease-stricken town can be entirely freed from the plague of malarial fever by draining all ponds, etc., at the cost of a few shillings per head of the population each year.

In 1901 and 1902, the Government of the Malay States began draining ponds, etc., in the terribly malarious towns of Klang and Port Swettenham. Three years after, it was found that malaria had practically ceased to exist in the areas treated. The annual cost was £140, and the total cost £7,000 for Port Swettenham.

Since 1886, almost all of the 8,000 inhabitants of Ismailia on the Suez Canal have suffered from malaria. Work was begun in 1901 against the mosquitos. Since 1903, no larvae of anopheles and no cases of malaria have appeared. The first cost was less than £2,000, and the annual expense about £726. Last May, Dr. Ronald Ross was asked to study the malaria present in Greece. He found nearly half of the people he examined with an enlarged spleen, one of the sequelae of malarial fever. The whole rural population is being decimated by this scourge. An Anti-malarial League, headed by the King, has now commenced work. It is obvious, says Dr. Howard, that the wiping out of this disease, wherever it may exist, is simply a matter of funds and public spirit.

### INOCULATION OF CATTLE AGAINST THE TSE-TSE DISEASE.

Dr. Diesing contributed to *Tropenpflanzer*, November 1905, an account of the successful inoculation of cattle against tse-tse disease in the Cameroons. The following is a short abstract of this article:—

This disease extends throughout the whole coastal zone of forests. The paths followed by caravans and the river channels, and especially the crossing points of the two, are particularly to be feared. The grassy regions inland, at a height of 2,500 feet and upwards, are free from infection. Further inland, where the land slopes down to Lake Tschad, the disease is met with again, especially in the rainy season.

In June 1903, Dr. Diesing found at Jaunde horses, cattle, and sheep all affected with the chronic form of the disease and dying in a few months or less. Donkeys from Adamaua, however, seemed to have become naturally resistant. Though sensible to infection, natural or artificial, they fully recovered, and none of the parasites were to be found in their blood, while their blood, after recovery, would not infect sensitive animals, like dogs and rats. After infecting these donkeys several times, Dr. Diesing found that the serum of their blood would prolong, for a month or more, the life of a horse or cow dying of the disease. Its injection decreased the number of trypanosomes. After several experiments, procuring serum from four donkeys, the doctor treated 152 cattle with injections. He found that there was complete protection for at least fourteen days, and that these cattle could be transported across the dangerous forest zone without being infected, while untreated cattle invariably died. Only five out of the 152 were infected, and these had stayed too long in the tse-tse region.

**Kapok.** In the official bulletin of the French colonies, *l'Agriculture Pratique des Pays Chauds*, for November 1906, M. Paul Serre states that the exportation of kapok from Java amounts to more than 4,400 tons a year. In the West Indies this product, yielded by *Eriodendron anfractuosum*, has been found to cost too much to gather, since the pods have to be picked, before they open, from lofty trees, 50 to 60 feet high. The prices of kapok from Batavia, f.o.b. at French ports, are about £2 16s. per cwt. for the ordinary kind and over £3 1s. per cwt. for superior qualities. The prices are subject to sudden fluctuations.



## AGRICULTURE IN ST. LUCIA.

In the *Annual Colonial Report* on St. Lucia for 1905, the Administrator discusses at some length the agricultural prospects in that island. The following extracts are of interest:—

Sugar and cacao continue to be the principal products grown for exportation, and native food stuffs for local consumption. The price of sugar in 1905, as declared for exportation, was £1 per ton less than in 1904, and the total value exported was £45,163, as against £53,799 in 1904. A temporary rise in price had occurred, but unfortunately, it had fallen before the sugar was put on the market, and the anticipation of large profits was not realized.

The quantity of cacao exported was larger than in any previous year, being 9,468 bags of 200 lb., valued at £38,041, as against 6,679 bags, valued at £29,008, in 1904. The evidence seems to point to a moderate but steady increase in the area under cultivation in recent years, and it is the most hopeful sign for the future prosperity of the island which I have observed. Many of the plots have, however, a neglected appearance, indicating a want of proper cultivation and pruning, and the reports of the Agricultural Instructor show that in cases where the Department of Agriculture has taken over patches of cacao in bad order for experimental purposes and devoted proper attention to them, the yield speedily increased, and satisfactory returns were obtained. If the people could be induced to assimilate the lessons taught by these experiments, the exports would probably be doubled in two or three years. The community, however, appears to be intensely conservative and somewhat suspicious of suggestions, and it may take some time to convince them generally of the truth of the results established by the experiments conducted under the direction of the Imperial Commissioner of Agriculture. Some progress has nevertheless been made, and after consultation with Sir Daniel Morris, it has been agreed that the Agricultural Instructor should arrange for a series of meetings at which lectures should be delivered.

From the returns made by proprietors under the Minor Products Protection Ordinance, 1899, it would appear that there are in the island 1,315 persons who cultivate cacao, of whom 505 have from 1 acre to 2 acres; 177, from 2 to 3 acres; 293, from 3 to 5 acres; 212, from 5 to 10 acres; fifty-one, from 10 to 15 acres; twenty, from 15 to 20 acres; thirty-one, from 20 to 30 acres; twelve, from 30 to 40 acres; six, from 40 to 50 acres; and eight, over 50 acres under cultivation—the total acreage being 6,161 acres.

The export of cacao for the year was 1,893,600 lb., showing an average return of 307 lb. per acre, which, taking into consideration young plantations yielding nothing, the Agricultural Instructor believes to be a fair average. He adds: 'The comparatively low average is due here, as elsewhere, to neglect of cultivation on the part of the uneducated peasant proprietors, who, as a class, probably, do not obtain more than 2 cwt. per acre, while the more intelligent planter may get an average of 5 to 6 cwt. The latter yield is distinctly good as an average over a large area, though it is not unusual for certain favoured cacao spots to yield 12 cwt. or more.'

The maturity of the young plantations now in existence, coupled with more intensive cultivation, might reasonably be expected to bring about the increase of production which I have above indicated as possible, but the difficulty of persuading the people to abandon unthrifty methods, and to adopt thrifty ones, will probably militate against entire success, unless the Government obtains the cordial support of all classes in the endeavour to overcome it.

## AGRICULTURAL DEPARTMENT.

The agency through which efforts are being made to improve tropical agriculture has its headquarters in Barbados, under the direction of Sir Daniel Morris, Commissioner of Agriculture, and is supported by the Imperial Government. Locally, there is a Botanic Station, and an Agricultural School, and from time to time plots of cacao or sugar-cane are singled out on plantations and taken under the care of the Department to be worked up as demonstrations of how the yield can be increased by improved methods of cultivation and treatment.

The three main lines on which it appears to me that most beneficial results will accrue to the inhabitants, if consistently followed, are the adoption of measures to prevent tropical diseases, the general spread of knowledge of agriculture, so as to prevent wasteful methods of cultivation and induce prosperity, and the general brightening of intelligence by sound utilitarian education.

## EDUCATIONAL.

### British Guiana.

The report of the Government Analyst in British Guiana, for the year 1905-6, contains the following reference to educational work in connexion with the laboratory:—

During 1905-6, the teaching of science was entrusted to Mr. English, Science Lecturer of this Department. Mr. P. V. Garraway, second Assistant Analyst, has also devoted two afternoons in each week during term time to teaching science at Queen's College.

Mr. English reports as follows on the results of the science teaching at Queen's College, at the Catholic Grammar School, and to the primary schoolmasters:—

'Owing to the re-arrangement of the periods of work at Queen's College, the time devoted to theoretical work amongst the fourth, fifth, and sixth forms has been reduced from two hours to two periods of three-quarters of an hour each during the week. This causes great difficulty in getting through the necessary amount of theoretical work, but the Principal was unfortunately quite unable to arrange for the extra period I requested. The results obtained in the Cambridge Local Examination were better than those of the previous year. Of eleven entries there was only one failure. Amongst the seniors, four passes were obtained in theoretical and two in practical chemistry; amongst the juniors, two in theoretical and five in practical.

'Three senior boys are now taking extra chemistry.

'I cannot at present report very favourably of the work at the Catholic Grammar School, but as the Principal is now taking steps to see that preparation work is done, improvement may be expected.

'The lectures to schoolmasters on science and agriculture have been delivered as previously in Georgetown, New Amsterdam, and Anna Regina; the attendance has been good, and the results of the examination have been somewhat more satisfactory than those of the previous year.'

Judging from the above and from the answers to the questions set at examinations of the Queen's College boys and the attendance at lectures to primary schoolmasters, it is evident that a knowledge of natural science in the colony is gradually extending.



## NEW CANADIAN TARIFF.

The following extracts from the new Canadian tariff relating to the new duties on sugar and molasses are published for general information :—

All sugar above No. 16 Dutch standard in colour, and all refined sugars of whatever kinds, grades, or standards, testing not more than 88° by the polariscope, per 100 lb. \* :—

B., 72c. ; I., 98c. ; G., \$1.08 ; F., \$1.08.

And for each additional degree over 88° per 100 lb. :—

B., 1c. ; I., 1½c. ; G., 1½c. ; F., 1½c.

Provided that fractions of five-tenths of a degree or less shall not be subject to duty, and that fractions of more than five-tenths shall be dutiable as a degree.

Provided that refined sugar shall be entitled to entry under the British preferential tariff, upon evidence satisfactory to the Minister of Customs that such refined sugar has been manufactured wholly from raw sugar produced in the British colonies and possessions, and not otherwise.

Sugar, n.o.p., not above No. 16 Dutch standard in colour, sugar drainings or pumpings drained in transit, melado, or concentrado melado, tank bottomis, sugar concrete, and molasses testing over 56° and not more than 75° by the polariscope, per 100 lb. :—

B., 34c. ; I., 45c. ; G., 52c. ; F., 40c.

And for each additional degree over 75° per 100 lb. :—

B., 1c. ; I., 1½c. ; G., 1½c. ; F., 1½c.

Provided that fractions of five-tenths of a degree or less shall not be subject to duty, and that fractions of more than five-tenths shall be dutiable as a degree. Provided that all raw sugar, including sugar specified in this item, the produce of any British colony or possession shall be entitled to entry under the British preferential tariff, when imported direct into Canada from any British colony or possession.

Molasses produced in the process of the manufacture of the cane sugar from the juice of the cane without any admixture with any other ingredient, when imported direct from the place of production or its shipping port in the original package in which it was placed at the point of production, and not afterwards subjected to any process of treating or mixing, testing by the polariscope not less than 30°, nor more than 56°, under regulations prescribed by the Minister of Customs, per gallon :—

B., free ; I., 2½c. ; G., 3c.

Molasses, testing not more than 56° by the polariscope, the produce of any British country entitled to the benefits of the British preferential tariff when produced from sugar cane and imported direct by ship from the country of production, or from any British country, in the original package in which it was placed at the point of production, and not afterwards subjected to any process of treating or mixing, provided, however, that the said molasses may be transferred in bond under excise regulations for purposes of distillation.

(Old tariff.—Molasses, produced in the process of manufacture of cane sugar from the juice of the cane without any admixture with any other ingredient, when imported in the original package in which it was placed at the point of production, and not afterwards subjected to any process of treating or mixing, the package in which imported when of wood to be free, (a) testing by polariscope 40° or over, 1¼c.

per gallon, (b) when testing less than 40° and not less than 35°, 1¼c. per gallon, and in addition thereto 1c. per gallon for each degree or fraction of a degree less than 40°.)

Maple sugar and maple syrup, per cent. :—

B., 15 ; I., 17½ ; G., 20 ; F., 20.

Glucose or grape sugar, glucose syrup or corn syrup, or any syrups containing an admixture thereof, per 100 lb. :—

B., 35c. ; I., 45c. ; G., 50c. ; F., 75c.

Syrups and molasses of all kinds, the product of the sugar-cane or beet, n.o.p., and all imitations thereof or substitutes thereof, per 100 lb. :—

B., 35c. ; I., 45c. ; G., 50c. ; F., 75c.

Sugar-candy and confectionery of all kinds, including sweetened gums, candied peel, candied pop-corn, candied fruits, candied nuts, flavouring powders, custard powders, jelly powders, sweetmeats, sweetened breads, cakes, pies, puddings, and all confections containing sugar, per cent. :—

B., 22½ ; I., 32½ ; G., 32 ; F., 35.

## HOW TO GROW GLOXINIAS IN THE WEST INDIES.

These gorgeous flowers are comparatively easy to grow in the West Indies, if the grower is able to give them that care which is indispensable.

As it is rather expensive to import full-grown plants, it is better to raise them from seed. Excellent seed (for percentage germination and quality of flower) is to be obtained from those English seedsmen who send it out in soldered tins. The seeds (which are very small) should be sown immediately after opening the tin. November or December are good months in which to sow them.

A well-drained flower-pot (with crocks and cocoa-nut fibre at the bottom) is filled, to 1 inch from the top, with a mixture of washed sand and garden loam. It is then thoroughly baked, in an oven, to kill all weed seeds and fungi. When cool, its contents are well watered. The seed is sprinkled evenly on the surface, which is then pressed down. It is difficult to sow thinly enough. The pot is covered with glass and shaded from direct sunlight. This glass may be raised in damp weather. The pot should be watered, if necessary, by standing it in water until the top gets wet by capillary attraction.

When the young plants are big enough to handle, they must be transferred to other pots, where they can be farther apart, on the point of a knife (still in the shade, as on the north side of a house in December). When they are large enough, they can finally be put singly in small pots filled with equal parts of sand, loam, and leaf mould or well-rotted pen manure.

When well established, the plants should be exposed to sunlight which has passed through one or two layers of wire gauze. They should be fed by watering with a solution of ¼ oz. of potassium or ammonium phosphate and ¼ oz. nitre in 1 gallon of water. The pots should not be watered until the plants evidently need it. Without feeding, the flowers will be fewer and smaller. Gloxinias will not stand full sunshine or wind. These flowers are considered by some to be the most beautiful specimens of the florist's creation. The leaves grow, if cut off when full-grown, planted in moist sand, and shaded from direct sunlight.

\* B. = British Preferential Tariff. I. = Intermediate.  
G. = General. F. = Former Tariff.



## MARKET REPORTS.

**London**,—December 18, 1906. Messrs. KEARTON, PIPER & Co.; Messrs. E. A. DE PASS & Co., December 14; 'THE WEST INDIA COMMITTEE CIRCULAR,' December 18; 'THE LIVERPOOL COTTON ASSOCIATION WEEKLY CIRCULAR,' December 14; and 'THE PUBLIC LEDGER,' December 15, 1906.

ALOES—Barbados, 15/- to 60/-; Curaçoa, 18/- to 56/- per cwt.

ARROWROOT—St. Vincent, 2½d. to 2¾d. per lb.

BALATA—Sheet, 1/6 to 2/-; block, 1/6 to 1/7 per lb.

BEES'-WAX—£7 10s. to £8 per cwt.

CACAO—Trinidad, 85/- to 92/- per cwt.; Grenada, 75/- to 79/- per cwt.

CARDAMOMS—Mysore, 8d. to 3/4 per lb.

COFFEE—Jamaica, good ordinary, 41/- per cwt.

COTTON—Good medium, 6.50d.; West Indian Sea Island, good medium, 18½d.; medium fine, 19½d.; fine, 21d.; extra fine, 25d. per lb.

FRUIT—

GRAPE FRUIT—6/- to 8/- per box.

BANANAS—Jamaica, 4/- to 4/6 per bunch.

LIMES—3/- to 3/3 per box of 200.

ORANGES—10/- to 11/- per box.

PINE-APPLES—St. Michael's, 2/6 to 5/- each.

FUSTIC—£4 5s. to £4 15s. per ton.

GINGER—Jamaica, common, 56/- to 58/-; middling to fine, 62/- to 85/- per cwt.

HONEY—Red, 21/-; brown, 21/6 to 23/-; pale set, 24/- to 25/6 per cwt.

ISINGLASS—West Indian lump, 2/- to 2/4; cake, 1/1 per lb.

KOLA NUTS—2½d. to 6d. per lb.

LIME JUICE—Raw, 9d. to 1/2 per gallon; concentrated, £21 17s. 6d. to £22 per cask of 108 gallons; hand pressed, 3/6 per lb. Distilled Oil, 2/4 per lb.

LOGWOOD—£4 to £4 10s.; roots, £3 10s. to £4 per ton.

MACE—good pale, 1/6; dark to fair reddish 1/2 to 1/4 per lb.

NITRATE OF SODA—Agricultural, £12 10s. per ton.

NUTMEGS—62's, 1/9; 68's, 1/2; 74's, 10½d.; 84's, 9d.; 93's, 7½d.; 100's, 6½d.; 109's, 6d.; 120's, 5d. per lb.

PIMENTO—Fair, 2½d. to 2¾d. per lb.

RUM—Jamaica, 2/3 Demerara, 1/2 to 1/3½ per proof gallon.

SUGAR—Yellow crystals, 16/6 to 17/9 per cwt.; Muscovado, 14/6 to 15/- per cwt.; Molasses, 11/6 to 12/- per cwt.

SULPHATE OF AMMONIA—£11 17s. 6d. to £12 per ton.

**Montreal**,—December 7, 1906.—Mr. J. RUSSELL MURRAY.  
(In bond quotations, c. & f.)

COCOA-NUTS—Jamaica, \$28.00 to \$29.00; Trinidad, \$26.00 per M.

COFFEE—Jamaica, medium, 10c. to 12c. per lb.

GINGER—Jamaica, unbleached, 13c. per lb.

MOLASSES—Barbados, 26c. to 27c.; Antigua, 22c. per Imperial gallon.

NUTMEGS—Grenada, 110's, 15c. to 15½c. per lb.

ORANGES—Jamaica, 10/-.

PIMENTO—Jamaica, 5½c. per lb.

SUGAR—Grey crystals, 96°, \$2.25 to \$2.35 per 100 lb.

—Muscovados, 89°, \$1.75 per 100 lb.

—Barbados grocery, \$2.20 to \$2.30 per 100 lb.

**New York**,—December 11, 1906.—Messrs. GILLESPIE BROS. & Co.

CACAO—Caracas, 17½c. to 18½c.; Grenada, 17¼c. to 17½c.; Trinidad, 17½c. to 18c.; Jamaica, 15c. to 16c. per lb.

COCOA-NUTS—Jamaica, \$25.00 to \$26.00; Trinidad, \$25.00 per M.

COFFEE—Jamaica ordinary, 7¼c. to 8c.; good ordinary, 8c. to 8½c. Superior, 10½c. per lb.

GINGER—Dark scraggy root, 10c. to 11c.; small to bright bold, 12c. to 14c. per lb.

GOAT SKINS—Jamaica, Antigua, and Barbados, 59c. to 61c.;

St. Kitt's, St. Thomas, and St. Croix, dry flint, 50c. to 51c. per lb.

GRAPE FRUIT—Jamaica, \$2.50 to \$3.00 per barrel; \$1.00 to \$1.25 per box.

HONEY—Jamaica, 72c. per gallon.

LIMES—No quotations.

MACE—35c. per lb.

NUTMEGS—85's to 90's, 17c.; 95's to 100's, 14½c.; 105's to 110's, 13½c.; 115's to 120's, 12c.; 120's to 140's, 11c.

ORANGES—Jamaica, \$3.25 to \$3.75 per barrel; \$1.50 to \$1.75 per box.

PIMENTO—5¼c. per lb.

SUGAR—Centrifugals, 96°, 3.82c.; Muscovados, 89°, 3.32c.; Molasses, 89°, 3.07c. per lb., duty paid.

## INTER-COLONIAL MARKETS.

**Barbados**,—December 31, 1906.—Messrs. T. S. GARRAWAY & Co., and Messrs. JAMES A. LYNCH & Co.

ARROWROOT—St. Vincent, \$4.50 to \$5.00 per 100 lb.

CACAO—Dominica, \$12.00 per 100 lb.

COCOA-NUTS—\$12.00 per M. for husked nuts.

COFFEE—\$10.50 to \$11.00 per 100 lb.

HAY—85c. to 90c. per 100 lb.

MANURES—Nitrate of soda, \$65.00; Ohlendorff's dissolved guano, \$55.00; Cotton manure, \$42.00; Cacao manure, \$42.00 to \$45.00; Sulphate of ammonia, \$75.00; Sulphate of potash, \$67.00 per ton.

ONIONS—Madeira, \$4.00 to \$6.00 per 100 lb.

POTATOS, ENGLISH—Nova Scotia, \$1.80 to \$2.00 per 160 lb.

RICE—Ballam, \$6.15 per bag (190 lb.); Patna, \$3.00 to \$3.75; Rangoon, \$2.70 to \$2.75 per 100 lb.

SUGAR—No quotations.

**British Guiana**,—December 22, 1906.—Messrs. WIETING & RICHTER.

ARROWROOT—St. Vincent, no quotations.

BALATA—Venezuela block, 25c.; Demerara sheet, 38c. per lb.

CACAO—Native, 15c. to 16c. per lb.

CASSAVA—72c. per barrel.

CASSAVA STARCH—\$5.50 per barrel.

COCOA-NUTS—\$10.00 to \$12.00 per M.

COFFEE—14c. per lb.

DHAL—\$4.40 to \$4.50 per bag of 168 lb.

EDDOS—96c. to \$1.68 per barrel.

MOLASSES—16½c. per gallon.

ONIONS—Madeira, 4c. to 4½c. per lb.

PLANTAINS—20c. to 44c. per bunch.

POTATOS, ENGLISH—Nova Scotia, \$2.50 to \$3.00 per barrel.

POTATOS, SWEET—Barbados, \$1.68 per bag.

RICE—Ballam, \$5.90 to \$6.10 per 177 lb.; Creole, \$4.50 to \$4.75 per bag (ex store).

SPLIT PEAS—\$6.10 to \$6.20 per bag (210 lb.).

TANNIAS—\$1.68 per barrel.

YAMS—White, \$1.68; Buck, \$1.68 per bag.

SUGAR—Dark crystals, \$2.00 to \$2.10; Yellow, \$2.50 to \$2.60; White, \$3.50 to \$3.60; Molasses, \$1.40 to \$1.75 per 100 lb. (retail).

TIMBER—Greenheart, 32c. to 55c. per cubic foot.

WALLABA SHINGLES—\$3.00, \$3.75, and \$5.25 per M.

**Trinidad**,—December 22, 1906.—Messrs. GORDON, GRANT & Co.

CACAO—Ordinary to good red, \$19.00 to \$19.25; estates, \$19.50 to \$20.00 per fanega (110 lb.); Venezuelan, \$18.00 to \$18.50.

COCOA-NUTS—\$21.00 per M., f.o.b.

COCOA-NUT OIL—75c. per Imperial gallon (cask included).

COPRA—\$4.15 to \$4.25 per 100 lb.

DHAL—\$4.35 to \$4.40 per 2-bushel bag.

ONIONS—\$2.50 to \$3.00 per 100 lb. (retail).

POTATOS, ENGLISH—80c. to \$1.25 per 100 lb.

RICE—Yellow, \$5.50 to \$5.75; White, \$5.50 to \$5.75 per bag.

SPLIT PEAS—\$5.40 to \$5.50 per bag.

SUGAR—Grocery, \$2.25 to \$2.50; molasses, \$2.00 to \$2.25 per 100 lb.





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Visit of the Delegation from the  
British Cotton-growing  
Association.

IN connexion with the visit to the West Indies of Sir Alfred Jones (President of the British Cotton-growing Association), Mr. J. Arthur Hutton (Chairman), Mr. E. Lomas

Oliver (Member of Council), and other members of the Association, a large public meeting to welcome the distinguished visitors was held in the chamber of the House of Assembly, Barbados, on Tuesday, January 8. The chair was taken by the President of the Agricultural Society (the Hon. F. J. Clarke), who extended on behalf of the cotton growers and the island generally a hearty welcome to Sir Alfred Jones and the other members of the British Cotton-growing Association. He briefly sketched the history of the cotton industry in the island, mentioning that four or five years ago, Sir Daniel Morris advised the planting of cotton in an experimental way in Barbados, and applied to the Association for help to erect a small ginnery. A gin and a baling press were lent, and the following year more gins. Their hearty thanks were therefore due for the assistance in starting the industry. Dr. C. E. Gooding, M.C.P., and Mr. H. E. Thorne, M.C.P., as large cotton growers, also joined in welcoming the visitors.

In reply, Sir Alfred Jones expressed his interest in adopting every possible means of making the colonies as successful as they could be. In connexion with cotton growing, Barbados had, he said, risen to the occasion in a very sensible way. He urged the cotton planters not to be misguided by the prospects of large profits. 'Work economically, work perfectly, and with close and careful study of your plant, and success is sure to follow. The cotton planter and the cotton consumer are allied together in a common interest. Our interests are mutual, and as far as the British Cotton-growing Association is concerned, you will meet with very kind sympathy from them.'

Mr. J. Arthur Hutton referred to the valuable assistance the Association had received from Mr. Oliver



and Mr. Wolstenholme. Had it not been for the exertions of these two gentlemen, planters would not have been able to get the excellent prices they had obtained for their cotton. As far as marketing of the cotton was concerned, no planter should be discouraged, for the British Cotton-growing Association was prepared at all times to look after the question of obtaining satisfactory prices. He urged planters not to base their calculations upon the present exceedingly high prices, which were due to the short crop in the Sea Islands, but rather to reckon on 1s. to 1s. 6d. per lb. as the price they would receive during a series of years. Already, 15,000 bales of Sea Island cotton had been shipped to Lancashire from the West Indies, and had it not been for that cotton, several of the mills would be standing still at the present time.

Speeches were also made by the Earl of Dudley, the Rt. Hon. H. O. Arnold-Forster, M.P., and the Hon. Forster M. Alleyne, M.L.C.

Sir Daniel Morris, K.C.M.G., then invited Sir Alfred Jones to present the gold medals which he had offered for competition among cotton growers. These medals had been awarded on the recommendation of local committees in the several islands, not on samples, but on crop results. The list of awards was published in the *Agricultural News* (Vol. V, p. 407).

A vote of thanks was proposed by Sir Daniel Morris to Sir Alfred Jones for his presence and the deep interest he had shown in the welfare of the West Indies in connexion both with the cotton industry and with the West Indian Agricultural Conference.

Later in the day, Sir Alfred Jones and several other members of the Association resumed their voyage to Jamaica in the S.S. 'Port Kingston.' The subject of cotton cultivation in the West Indies was fully discussed between these gentlemen and the delegates to the Agricultural Conference.

Messrs. Hutton and Oliver left Barbados the same day in S.S. 'Ocamo' for St. Vincent, accompanied by Mr. W. R. Buttenshaw, Scientific Assistant on the staff of the Imperial Department of Agriculture. Arriving in St. Vincent the next day, the delegation was received by a reception committee, which did everything in its power to render the visit a thorough success. Visits were paid to most of the important cotton estates, including Peter's Hope, Cane Grove, Grand Sable, Argyle, Diamond, etc. The cotton factory was twice inspected, and the delegation was much impressed by the satisfactory manner in which

the machinery was running, as also with the excellent quality of the cotton that was being produced in the island. Regret was expressed that a scarcity of labour was responsible for difficulties in getting all the cotton picked. It appeared that every possible attention was being devoted to the sorting and grading of the cotton, but it was felt that greater care was necessary in connexion with cultivation and particularly in the better organization of the picking operations.

A meeting of the Agricultural Society was held, under the presidency of his Honour the Administrator, at the Court House, Kingstown, on January 14, which was attended by practically all the cotton growers in the island. Interesting addresses were delivered by Mr. Hutton and Mr. Oliver. The former discussed the question of the factory being taken over by the planters and expressed the willingness of the British Cotton-growing Association to take shares in any company that was formed. The Association was also prepared to make advances on cotton shipments, while he thought they would be able to make favourable arrangements for insurance. (See *Agricultural News*, Vol. VI, p. 6.) Mr. Oliver congratulated the planters upon the manner in which they had overcome the defects in their cotton, which he had pointed out two years ago. St. Vincent was producing a very brilliant cotton, and had nothing to fear from competition.

Returning to Barbados on January 15, the delegation was taken to many of the cotton-growing estates throughout the island. On Friday, January 18, a large and influential meeting of planters was held at the Commercial Hall. The Hon. Forster M. Alleyne presided, while his Excellency the Governor was present and moved a hearty vote of thanks to the delegation. As at St. Vincent, Mr. Oliver referred to the satisfactory manner in which his suggestions of two years ago had been acted upon, and congratulated the planters on the improvement in the quality of their cotton. At the close of the meeting he exhibited a number of articles made from West Indian cotton, which, owing to its great lustre, was now being used for the manufacture of many articles which were formerly made of silk. Its high quality was therefore creating a demand in new lines.

It is felt that the visit of this delegation to the West Indies has given considerable stimulus to the cotton-growing industry. It is regretted, both by the delegation and growers alike, that, owing to the limited time available, it was impossible to arrange for visits to other cotton-growing islands, such as Montserrat, Antigua, and St. Kitt's.



## SUGAR INDUSTRY.

### Sugar Shipments to Canada.

The following note on the probable effect of the new Canadian tariff on sugar shipments from the West Indies is extracted from the *West India Committee Circular*, of January 1:—

There seems to be considerable uncertainty in sugar circles as to whether cargos sent to Montreal via New York from the West Indies will be entitled to the benefit of the British preference or not. The wording of the new tariff in this respect is precisely the same as that of the old, viz., that to obtain the preference there must be direct shipments to Canadian ports. In the past, however, this has not been given effect to, so long as the cargos were accompanied by their certificates of origin. Advices from Montreal distinctly lay down that the conditions of the clause are to be carried out; on the other hand, authorities on this side state that the position of matters in this respect will be as before. Should, however, the former obtain, shippers will do well to bear in mind that there is no lack of steam tonnage available, and that the united sea and land freight via St. John or Halifax is practically the same as through New York, and that by combination the sellers should be able to obtain some of the amount of the preference from the refiners. In connexion with this subject, it may be pointed out that the latter have already provided against the extra cost of raw sugar, due to the increased duty, by raising the price of refined 10c. per 100 lb.

### Sugar-cane in India.

In May 1906, Mr. C. A. Barber, F.L.S., Government Botanist, Madras, issued a note on sugar-cane cultivation on the irrigated lands of the Godaveri Delta. The principal results obtained from the study and growth of the sugar-cane on the Samalkota experimental farm were as follows:—

- (1) The local canes were liable to disease and new varieties were obtained from India, Mauritius, and Barbados.
- (2) The land chosen must be easy of irrigation and certainly easy to drain. Disease had been worst in ill-drained spots.
- (3) The land must be deeply cultivated.
- (4) At least 1,000 head-loads of rotten weed compost were required per acre.
- (5) Tops or cuttings from the upper part of the cane, from healthy plants, should be used.
- (6) The number of cuttings should be greatly reduced (sometimes 50,000 to the acre being used locally) to 5,000 or 10,000 per acre.
- (7) The cuttings should be put in rows and not broadcast.
- (8) Supplies should be taken from a purposely closely planted strip of the field.
- (9) Ratoonings should be avoided on account of the disease.
- (10) A new crop could be gained by dividing the stools into two or three pieces and planting them in fresh land.
- (11) The land should be irrigated once in ten days for heavy and oftener for light soils. The water in the channels should be kept at least 4 inches below the beds.
- (12) Cheap oil cake was found to be the best manure.
- (13) If only nine months' irrigation could be allowed, the cuttings could be grown for some time in a nursery.

## VACUUM DRYING APPARATUS.

*Tropical Life*, for December 1906, contains the following account of the vacuum drying apparatus which has given good results with cacao, rubber, and other products:—

The concentration of liquids in a vacuum has, of course, been practised for a great many years, but it is only since the invention of vacuum drying chambers and apparatus of reliable designs, that the vacuum system has come into general use for the removal of moisture from a great variety of materials.

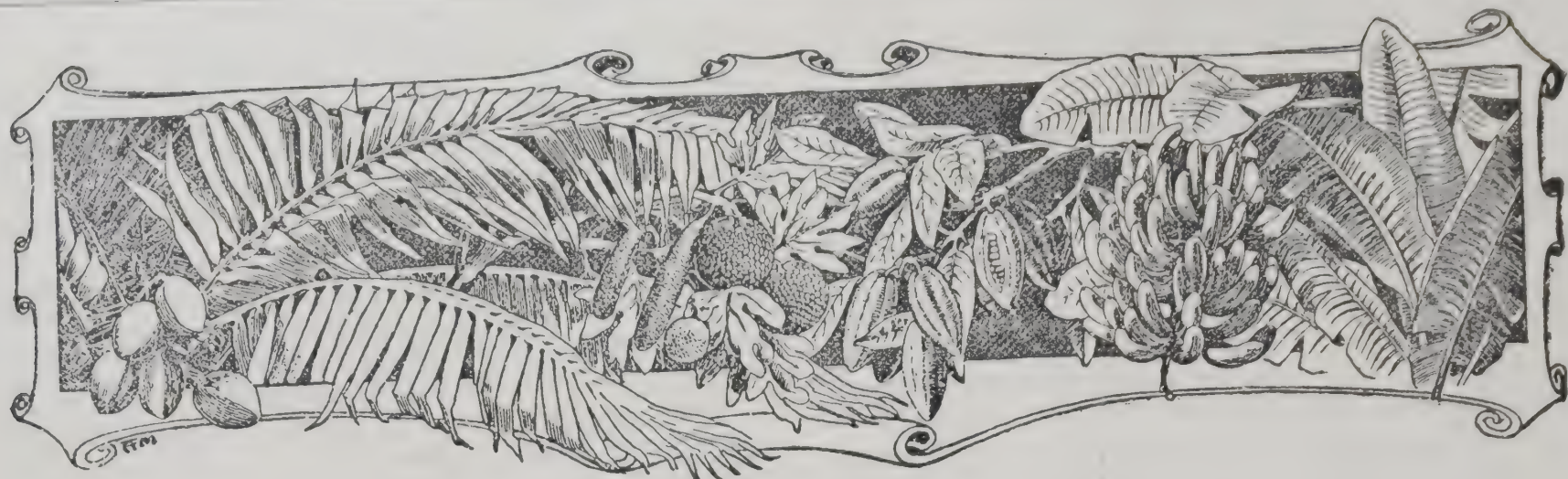
By the leading system the moisture is evaporated very rapidly, whilst the material remains at the lowest possible temperature, usually below 100° F. The process is quite independent of climatic influences and the consumption of fuel or heat, while the working expenses are much lower than is possible when the drying takes place under atmospheric pressure. There are other important advantages, such as the absence of rust on iron surfaces under vacuum, retention of the volatile oils and salts forming the flavour or aroma (most important in such articles as cacao, coffee, etc.); also, the surfaces of vacuum-dried materials remain softer and of a lighter colour than those that are air-dried.

As an example, the proprietors of a West African cacao plantation sent out an experimental vacuum drying chamber having heating shelves, between which trays containing the cacao beans were placed. It was found that the drying time was about four hours. The vacuum of 28 to 28½ inches corresponded to a boiling temperature of from 90° F. to 100° F. The beans were of a much brighter colour than when air-dried, either in the sun or by artificial means, and retained their natural rounded shape to a much greater degree than is usual. In consequence of the success of the experimental plant, the West African Plantation Company has now been supplied with two larger plants. They will each receive from 10 cwt. to 12 cwt. of cacao beans per charge, and will dry three charges in about twelve hours. Working night and day, about double this quantity would be dealt with. The steam required to evaporate the moisture from the beans, including that required for driving the air-pump, is about 1½ lb. for each 1 lb. of moisture removed.

The vacuum drying chambers have also proved of great benefit on rubber plantations. At the recent exhibitions in Singapore and Ceylon, block rubber, which has been made possible by the vacuum chamber, secured the first prizes, the gold medals being awarded to the exhibits of the Lanadron estate of Muar, F.M.S., which has had a vacuum drying chamber at work for some time. This vacuum-dried block rubber has also secured the substantial preference of from 2d. to 3d. per lb., when sold on the London market, over any other kind of rubber. On other estates the chambers are used for sheets and biscuits.

The drying time for rubber is from one and a half to three hours, according to the amount of moisture held by the rubber. A vacuum drying plant has recently been supplied to a Mexican rubber plantation. For many years the vacuum drying chambers have been in use in the rubber works for drying the washed rubber sheets and towels, and it is estimated that the 150 chambers (and more) supplied for this purpose by a single firm (that of Emil Passburg, of Berlin, represented in London by Mr. James Livingstone of 30, Great St. Helens), dry about 30,000 tons of wet rubber annually. Cacao, tea, gambier, fruits and vegetables of all kinds, starch, peels, and a great variety of all kinds of materials are now dried in vacuum chambers, the demand for which has greatly increased of late.





## WEST INDIAN FRUIT.

### NEW CITRUS HYBRIDS.

In the *Scientific American*, for November 3, 1906, there is an illustrated article on 'New Citrus Hybrids of the U. S. Department of Agriculture,' by Herbert J. Webber and Walter T. Swingle.

(1) The Sampson 'Tangelo' is a hybrid between the Dancy tangerine and the ordinary grape fruit. The cross was made in Florida. The hybrid fruit produced 106 seedlings, only one of which did not resemble the grape fruit in its fruit. The colour of the skin is intermediate between its parents, as are the colour and taste of the pulp. It is about  $2\frac{1}{2}$  inches across, and its rind and segments separate easily. It is believed that it will be appreciated in the market.

(2) Two new hybrid tangerines have been produced by crossing the Parson Brown early orange with the Dancy tangerine. These are larger, earlier, and more highly flavoured than ordinary tangerines.

### BANANAS IN ENGLAND.

The following reference to the consumption of bananas in England is taken from *The Times*, of December 26, 1906:—

The banana entries have been enormous. The average for the month, week by week, has not been less than 100,000 bunches, so that the stocks have been large. The arrival of red-, purple-, and yellow-skinned bananas at the one time has caused some stir in fruit trade circles, as it is said that in future seasons the shippers will send fair quantities of each into the British markets for Christmas. Whether the popularity of the red- and purple-skinned fruits will equal that of the ordinary yellow-fingered banana remains to be seen, but for table decorative purposes there is ample room for good quantities of each. As curiosities, some of the purple-coloured fruits realized from 10s. to 12s. a bunch wholesale. The Canary 'giants' are in demand, and making fancy figures in special cases, but general rates have been cheap this Christmas. The present has been an excellent season for these fruits, as far as the nature of the imports is concerned. By the close of the year all records will be easily broken, and a total of 7,000,000 bunches will be reached. It is stated that a movement is on foot to secure the distribution of all bananas without their stalks, by which method the cost will be reduced considerably. Tests made in this direction have proved highly satisfactory. There are large quantities of Costa Rica and Jamaica bananas on sale.

### 'JULIE' MANGO.

The *Bulletin* of the Trinidad Botanical Department, for January, contains the following note on this popular variety of mango:—

The mango known as the 'Julie,' is one of the best, or perhaps the very best, of all the introduced kinds, and is daily gaining in favour, the demand for plants at the Government Experiment Station being larger than for any other kind. Among the reasons for this preference are: (1) Its excellent flavour; (2) Keeping qualities; (3) Suitability for transport; (4) Early bearing; and (5) Its ability to produce regular annual crops.

Its flavour recommends it to the majority of consumers, and as it has little or no fibre, it is eminently suitable for table use. Probably no mango known, keeps good a greater length of time, and its tough skin renders it easy to pack for transit to long distances.

It fruits at a very early age, often commencing at four years from planting, and sometimes earlier. The tree has a dwarf, bushy habit, but in time grows to a large size. The 'Julie' is one of the most regular croppers of all the mangos.

It has been exported to England from Trinidad, and has arrived in first-class condition.

Compared with it, the famous Jamaica No. 11 is 'out in the cold,' as it can be eaten with a spoon, while the No. 11 is characterized by the large amount of fibre which adheres to the seed. It is a long way superior to the 'Peters' or 'Malda,' and is always found in superior condition to that mango, which has the fatal fault of being frequently sour at the centre.

Altogether, 'Julie' takes the first place among the cultivated mangos of Trinidad, and the trees suffer less from disease than most other kinds. It is certainly a fruit which can be highly recommended for cultivation for export.

### THE 'PAPAW' OF THE UNITED STATES.

The two cultivated and six wild species of Eastern North American shrubs and small trees, to which the name 'papaw' is commonly applied by the Americans, are species of *Asimina* (natural order *Anonaceae*) closely related to the sweet sop or sugar apple of the tropics. The two cultivated species bear attractive flowers and edible fruits. One will grow in the open in New York State. The true papaw of the tropics, *Carica Papaya*, is not in any way related to the above-mentioned species. It is called in the United States 'melon papaw' for the sake of distinction. It grows in the open only in South Florida; but is frequently grown in conservatories north of the frost line.



## THE OIL-GRASSES OF INDIA AND CEYLON.

*Kew Bulletin*, No. 8, 1906, contains the results of a study of the oil-grasses by Dr. Otto Stapf. A thorough overhauling of the species and varieties had been necessitated from the confusion which had arisen as to the plants from which certain oils were produced. Twelve species are dealt with; of these, the following are of economic interest:—

*Cymbopogon Schoenanthus*, Spreng. (*Andropogon Schoenanthus*, Linn., not of most authors.)

Yields camel-grass oil. The type specimen of Linnaeus is not discoverable. The name *Schoenanthus* has been applied to this grass for 2,000 years. Its oil is used medicinally in the Punjab, but is not an article of commerce; 6½ lb. of dry grass yielded 1 oz. of oil.

*Cymbopogon Nardus*, Rendle. (*Andropogon Nardus*, L.)

Yields citronella oil. Citronella grass. Named by Linnaeus from a Ceylon specimen collected 1672-7. Was confused with lemon grass, since the French name for lemon grass is citronelle. It is cultivated in Ceylon, Penang, Straits Settlements, Java, and West Indies. There are two varieties in Ceylon. *Maha pengiri*, or old citronella, yields a more valuable oil (according to Schimmel & Co.) containing 50 per cent. of citronellal and 38 per cent. of geraniol, has broader leaves and larger clumps, but needs replanting every ten or fifteen years. *Lenabatu pengiri*, or new citronella, is more commonly cultivated in Ceylon, yields an inferior oil containing 28 per cent. of citronellal and 33 per cent. of geraniol, but lives longer. *C. Nardus* is only known in cultivation, has no awns, and the flowers are partially sterile.

*Cymbopogon flexuosus*, Stapf.

Yields Malabar, Travancore, or Cochin lemon-grass oil. Malabar grass. It was figured and described by Rheedé in 1703 from Malabar. Described in 1855 by Steudel who retained Nees' name of *Andropogon flexuosus*. It is found wild on the plains of Travancore and northwards. Its oil is not distinguished in commerce from the oil of *C. citratus*, and contains 70 to 75 per cent. of citral.

*Cymbopogon citratus*, Stapf. (*Andropogon citratus*, DC.)

Yields lemon-grass oil. Lemon grass. Referred to by Petiver in 1695. Cultivated at Kew at the beginning of the nineteenth century. Brought from Java or East Indies to India about the seventeenth century, probably by the Portuguese. Introduced into Jamaica about 1799. Introduced into Africa and Brazil. Not known wild. Flowers extremely rare. The oil was first known to be prepared in the Philippines in the seventeenth century. It is inferior to that of *C. flexuosus*.

*Cymbopogon Martini*, Stapf. (*Andropogon Martini*, Roxb.)

Yields palmarosa, Rusá, or East Indian geranium oil. Found wild in 1790-2 by General Martin. Common in the north-west of India. Used as a fodder. Oil contains 76 to 93 per cent. of geraniol.

*Vetiveria zizanioides*, Stapf. (*Phalaris zizanioides*, L.) (*Andropogon muricatus*, Retz.)

Yields Vetiver oil. The dried roots give out a pleasant odour when wetted. It is common wild in India, Ceylon, and Burma. It is cultivated in the East Indies, Réunion, the West Indies, and Brazil.

*Andropogon odoratus*, Lisboa.

Found in Bombay. Ginger smell. Gives an oil smelling like cassia, which is not produced commercially.

## ✓ GERMINATION OF THE COCOA-NUT.

The following notes on the germination of the cocoa-nut will be found to supplement a previous note on the same subject (*Agricultural News*, Vol. IV, p. 71), to which reference may usefully be made:—

Three lines on the stem end of the shell divide the ripe nut into thirds. One of these three parts is larger than the other two, and here is the softest of the three 'eyes' or pits, under which is the embryo, about  $\frac{1}{3}$  inch long. The endosperm is thin just under the embryo, apparently to allow of the easy growth of the soft seed-leaf into the cavity, and perhaps to allow the air, which is present in the fully ripe nut, to reach the embryo.

The nuts are planted in their husks. When husked before planting, they have been noticed to split across during germination, with fatal results to the embryo. It has been found that the greatest percentage of cocoa-nuts germinate when they are put in the soil on their sides, with the stem end a little higher. This is nearly the natural position of a fallen nut. In this position the embryo will have access to any air in the hollow of the nut, and the shoot comes out easily through the husk. If planted vertically, with the stem end upwards, water often accumulates outside, above the embryo, and rots it, and the roots cannot get through the husk so well. In this case experiments have shown that 20 per cent. fewer nuts germinate than is the case with nuts planted on the side with the stem end slightly raised. Nuts planted in damp soil grew just as well if buried to the level of the soil, as if sunk to a depth of 4 inches, and the cost of the former method was less than half that of the latter.

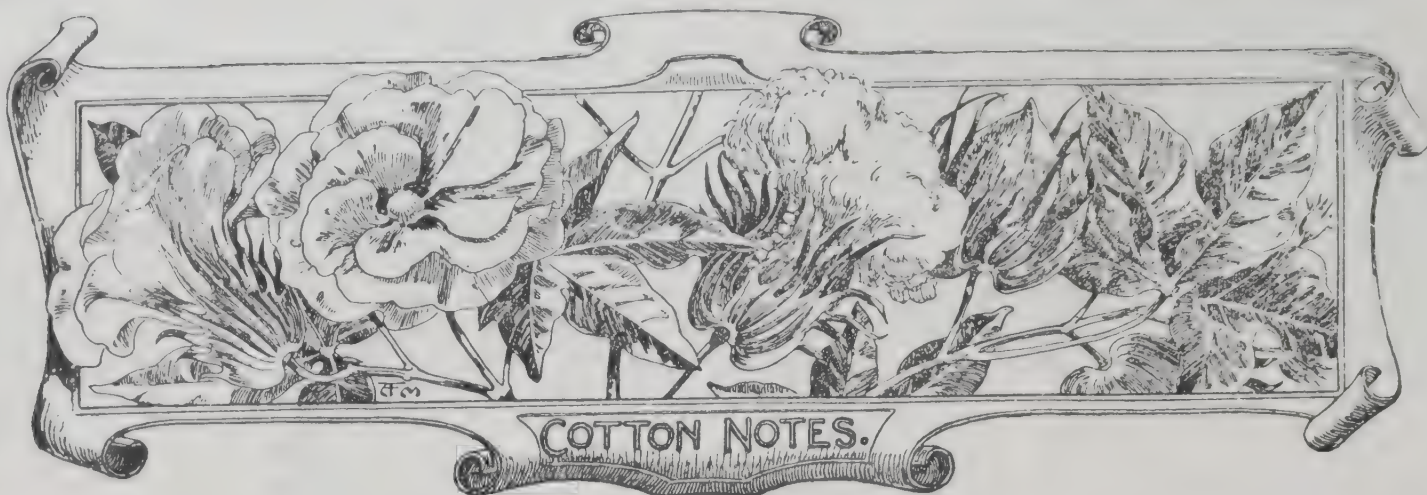
When germinating, the outer end of the embryo breaks through the soft skin of the pit, and forms a bud above, and several roots below. The inner end of the embryo becomes spheroidal and grows larger, remaining connected with the shoot and roots outside through the open pit, by a thin neck, which soon becomes woody. The shoot, covered with primitive leaves, ends in a hard point, which grows straight up and bores through the now rotting husk. It emerges from the husk in three months, more or less, after planting.

The first leaves are simple, and the next palmate, and it is some time before pinnate leaves appear. The roots are of nearly equal sizes and grow out together from the base of the stem. They quickly bore downwards through the rotting husk. These roots are not permanent, and the new roots grow out of the stem higher up. Hence we see the advantage of finally planting the cocoa-nut in a hole, a few feet deep, which can be gradually filled in as the stem grows.

The nearly spherical or egg-shaped seed-leaf grows slowly into the cavity of the cocoa-nut. Its surface is wrinkled lengthways, and it is of a soft, spongy texture. Where it touches the endosperm (at first next the stem end of the nut), this is softened, liquified, and sucked in by the surface of the seed-leaf. If the plant is cut off from the seed-leaf and the other contents of the shell when about half the endosperm has been digested, it will still survive, if planted in good soil. The process of digestion continues until the cavity has been entirely filled by the seed-leaf and only a little endosperm is left at the further end of the shell. Then the neck withers, breaks, or rots, and the palm is independent of the food which supplied it during infancy.

The skin of the seed-leaf contains much oil, taken in from the endosperm, but no starch. In the spongy interior of the seed-leaf, on the other hand, there is much starch and sugar, but no oil. Somewhere between the two, the oil was converted into sugar and starch, a process which requires a large amount of oxygen.





### WEST INDIAN COTTON.

The following is a copy of a letter, addressed by Mr. Charles M. Wolstenholme, of Messrs. Wolstenholme & Holland, to Mr. J. Arthur Hutton, the Chairman of the British Cotton-growing Association:—

Much as I desire to visit the West Indies some time, I really feel that my duty is to remain here to look after the planters' interests personally this season, which is going to be an exciting one, with wide fluctuations in price, and I hope you will kindly mention this to the planters as the reason for my absence. I shall also be obliged if you will, for the good of the industry, impress upon all you meet the following recommendations:—

(1) To avoid ratooning at all cost, for, although an occasional sale of ratooned cotton may realize a very full price, the buyer, when he has discovered the defects in the working of the lot, will, in future, not trust his own judgement, but will boycott the growth from that particular island, whether the lint be good or bad. And should an island get a name for shipping ratoon cotton, its product will drop pence per pound as compared with other growths.

(2) To avoid mixing inferior cotton with good, which is sometimes done, even though the small quantity of inferior has to be shipped in the same bag. We recently discovered about 60 lb. of low cotton, worth 8d. per lb., in a bag sold at 18d.

(3) To make up crop lots of 5 to 10 bags, if possible, before shipment. The present system of shipping odd bags belonging to different planters by each ship, as is practised by Barbados at present, prevents our establishing the marks, as spinners do not care to buy innumerable odd bags.

(4) To concentrate all cotton to the British Cotton-growing Association in the interest of the planters, as any competition of moment quickly produces a falling market, particularly if the cotton gets into the hands of firms in Liverpool, who are not in daily cable communication with Savannah and Charleston. Buyers of Sea Island cotton are few and well concentrated; and the same remark applies to the *sellors* in the above-mentioned towns.

(5) Planters must not be certain that they will obtain the same price as their neighbours in every instance, even though they, and we ourselves, may consider the quality equally good, because a buyer may inspect six lots and bid, say, 18d. for four of them, refusing the others, with the result that the next buyers are not prepared to pay more than 17d., owing, probably, to a fall in the Charleston market. That market often advances or declines 2d. to 3d. per lb. in a week, when active.

May I ask you, in conclusion, to assure them that the deep personal interest which I take in the industry in the West Indies constrains me to devote all the time at my disposal, in order to assist the British Cotton-growing

Association in furthering an industry, which, I am convinced, will enable many of the islands permanently to recover a prosperous condition.

### QUALITY OF WEST INDIAN COTTON.

The relationship between the quality of Sea Island cotton and the soil and rainfall is of very great interest in the West India islands at the present time.

The cotton grown in these islands varies considerably in quality, although the same seed was imported and distributed to the various islands. Not only has the quality of the cotton produced in one island differed from that produced in another, but great differences have manifested themselves when the cotton has been produced in different parts of the same island. Broadly speaking, the experience in these islands has been that the greater amount of moisture, up to a certain limit, has given a finer quality of cotton.

It will be readily understood that the same quantity of rain falling on different soils has very different values. The power of the soil to retain moisture has to be taken into consideration. This can be very well illustrated by the differences in the soils of St. Vincent and Barbados; in the former island the soil is very light and porous, while in the latter it is comparatively heavy and retains moisture to a much greater extent. So that, what would be considered a very satisfactory rainfall in Barbados would be looked upon as very low in St. Vincent, and what would be a good rainfall in St. Vincent would be much too heavy for Barbados. Thus, the amount of moisture available for the plant depends on the character of both the rainfall and the soil.

The quality of the cotton in the West Indies indicates that a scarcity of moisture produces a coarse quality of cotton, and as the amount of available moisture increases the quality becomes finer. This increase of quality, however, only goes on to a limited extent, there being a point beyond which the lint becomes weak, which is a factor to be avoided in Sea Island cotton.

The value of the rainfall is also considerably dependent on the way it falls; frequent light showers are of much more value during the growing or vegetative period than heavy rains, and during the fruiting period heavy rains may be ruinous, causing all the young bolls to fall to the ground.

The knowledge of the fact that an increase of moisture in the soil increases the quality of the cotton produced in it is of great importance, especially in places where the rainfall is low and the soil is of a porous nature. To increase the organic matter in such a soil, so as to make it more retentive of moisture, should be the aim of the planter, while, where the soil is of a retentive nature and the rainfall low, an extra effort should be made to hold the moisture by careful surface tillage.





## VISIT OF THE DELEGATION FROM THE BRITISH COTTON-GROWING ASSOCIATION.

*To the Editor of the 'Agricultural News.'*

Sir,—On behalf of my colleagues and myself, I wish to convey, through the medium of your columns, our most grateful thanks to those who have in any way contributed towards making our visit to Barbados and St. Vincent so interesting and so enjoyable.

I have also much pleasure in taking this opportunity of acknowledging, on behalf of the British Cotton-growing Association, the great debt of gratitude we owe to Sir Daniel Morris and to every member of the Reception Committees for the excellent arrangements they have made, which have enabled us in a very short time to visit a great number of the cotton plantations. The hospitality and kindness which we have met with everywhere have made the deepest impression on us, and we hope that at some future date we may have an opportunity of endeavouring to return the same in England.

We are full of admiration for the energy and enterprise which the planters of the islands which we have visited have shown in their most successful efforts in establishing a new industry, under the able guidance of the Imperial Department of Agriculture, on scientific lines.

It is to us a matter of the deepest regret that the climatic conditions of the last season have been so unfavourable, but there seems to be no doubt that, should the planters show the same enterprise and courage in the future as they have done in the past, cotton cultivation will soon become established in the West Indies on the only possible permanent basis, viz., as a remunerative business to the planters.

It is a matter for congratulation that the Imperial Government has decided to continue for a further period the operations of the Imperial Department of Agriculture, a decision which has largely been influenced by the fact that the planters are evidently inclined to avail themselves of its most valuable assistance to the fullest possible extent.

The prosperity of the West Indies is a matter of great importance to the Mother Country, and although the extent of the British Cotton-growing Association's operations in the West Indies is small, as compared with those in other parts of the British Empire, the success that has so far been obtained in these islands is alone full justification for the Association's existence.

In conclusion, I can only say on behalf of the Association that nothing can give us greater pleasure than to hear that, by the establishment of cotton growing as a permanent industry, the West Indies will year by year become more and more prosperous, to the joint benefit of the West Indies and of the Mother Country and of the whole of the British Empire.

Yours, etc.,

(Sgd.) J. ARTHUR HUTTON,

Chairman, the British Cotton-growing Association.

Barbados,

January 19, 1907.

## TRANSPORTING PARA RUBBER.

In an article in the *Tropenpflanzer*, for September 1906, by Dr. S. Soskin, it is stated that so uncertain was the transport of Para Rubber seed supposed to be, that the Samoa India Rubber Company lately went to the expense of sending 120,000 living plants of *Hevea brasiliensis* to Samoa in Wardian cases.

Of 150,000 seeds sent from Ceylon to Samoa in Wardian cases, which took fifty days in transit, nearly all were alive on arrival and had germinated.

The *Agricultural Bulletin* of the Straits and Federated Malay States, for January 1906, gives an account, by the Director of the Botanic Garden, of the following results of experiments in sending these seeds to great distances:—

(1) After a passage of eighty-two days, 7,000 seeds germinated out of 7,500 which were sent from Ceylon to Jamaica, in biscuit tins, 150 seeds being in each tin, with wood ashes below and sawdust above.

(2) One hundred seeds were sent from Ceylon to Calabar, taking seventy-six days. They were in slightly moist, powdered charcoal. Ninety germinated on arrival.

(3) Out of 135 seeds, packed in charcoal and sent to Kew, taking one month in transit, 123 germinated at their destination.

(4) Twenty seeds were sent, packed in charcoal, to Vera Cruz. The voyage lasted ninety-six days. Fourteen seeds germinated.

These experiments show that a suitable material in which to pack these seeds has now been found. The powdered charcoal used is first well wetted and then dried in the sun till it has reached a slightly moist stage.

A paper in the *Tropenpflanzer*, for November 1906, however, describes a novel method of transporting 'stumps' of *Hevea* seedlings, which bids fair to rival in its results the method of packing seeds in damp charcoal:—

Young plants, with stems about the thickness of a lead-pencil and less than 19 inches high, were removed from the seed-beds and reduced to 'stumps,' by cutting off the top of the stem, all leaves, and the end of the tap-root. The length of stem left was about a foot, with approximately 4 inches of root. These 'stumps' were closely packed in kerosene tins, which had a layer of damp soil at the bottom. The upper part of the tins was filled with a mixture of cocoa-nut fibre, sand, etc. Such 'stumps,' to the number of 100,000, were sent from Ceylon to Samoa, the passage taking six weeks. The number which failed to grow, when planted out, is estimated as, at most, 2 per cent. The price, f.o.b. at Colombo, was Rs. 50 per 1,000. The consignors guaranteed a mortality not exceeding one-quarter of the total number.

**Natural and Synthetic Indigo.** The *Tropenpflanzer*, for October 1906, has a short account of the diminished cultivation of indigo in India, caused by the cheaper production of the same dye by chemical means in Germany since 1897. In 1896-7, the total produce of indigo in India (reckoned as 100 per cent. quality) was over 11,000,000 lb., but in 1904-5 it was about 1,500,000 lb. This great reduction is accounted for completely when we regard the exports and imports of India's competitor, Germany. In 1897, Germany imported about 3,100,000 lb. of indigo, and exported only about 1,100,000 lb. But in 1904, Germany only imported about 570,000 lb., and exported the large amount of 19,200,000 lb. Synthetic indigo is the same as natural indigo, and contains no impurities.



## EDITORIAL NOTICES.

Letters and matter for publication, as well as all specimens for naming, should be addressed to the Commissioner, Imperial Department of Agriculture, Barbados.

All applications for copies of the 'Agricultural News' should be addressed to the Agents, and not to the Department.

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## Agricultural News

VOL. VI. SATURDAY, JANUARY 26, 1907. No. 124.

### NOTES AND COMMENTS.

#### Contents of Present Issue.

A brief account is given in the editorial of the visit to the West Indies of the delegation from the British Cotton-growing Association. Further references to this important visit will be found on pp. 22-3.

The vacuum drying apparatus has given good results with cacao, rubber, etc. (p. 19).

A note on the increasing popularity of bananas in England appears on p. 20; also, an account of the 'Julie' mango.

The statement in regard to oil-producing grasses will be of interest in view of the confusion that has existed in regard to their nomenclature (p. 21).

The general report on the results of the half-yearly examination of the Dominica Agricultural School is published on p. 26.

Interest attaches to the report on a sample of citrate of lime from Seychelles examined at the Imperial Institute (p. 27).

A leaflet has been issued in St. Lucia drawing attention to the necessity of improving the cacao plantations. A short summary appears on p. 29.

Three interesting books recently published are reviewed on p. 30.

Mr. Jackson's report on West Indian products in the London market appears on p. 31.

#### West Indian Agricultural Conference, 1907.

As most of the readers of the *Agricultural News* will be aware, the West Indian Agricultural Conference which was to be held in Jamaica from January 12-17, and which promised to be most successful, had to be abandoned owing to the disastrous earthquake that occurred on January 14, the first day of the session.

It is a matter for extreme gratification that all the delegates to the Conference escaped without injury.

It is proposed to publish the address of the President, as well as the papers which were to have been presented, in the *West Indian Bulletin* with as little delay as possible.

#### Lime Industry in St. Lucia.

The *Voice* of St. Lucia, for January 3, contains copies of account sales which show that, 'if markets are studied, and shipments made to suit the demand, in perfect packages and carefully packed, green limes from St. Lucia will yield a fair return.'

Two shipments to London of boxes, containing 170 to 200 limes each, netted respectively 3s. 1d. and 3s. 9d. per box, while the net proceeds of two shipments to New York of barrels of limes, containing 1,000 to 1,200 each, were 7s. 7d. and 14s. 2d., respectively.

A small quantity of lime juice (49 gallons), extracted by hand pressure, and prepared in a very primitive manner, netted nearly 8½d. per gallon in London.

#### Anthrax in St. Vincent.

In connexion with the efforts that are being made to deal with the outbreak of anthrax in St. Vincent, the Imperial Commissioner of Agriculture arranged while in England for the temporary services of Professor H. E. Annett, M.D., D.P.H., of the School of Pathology of the University of Liverpool.

Dr. Annett has had a wide practical experience of diseases of animals in tropical countries. He has worked with Koch for a considerable time and also at the Pasteur Institute. He has reported on filariasis in animals in Nigeria. In 1905, Dr. Annett went to the Argentine to visit the extensive cattle ranches in that country in connexion with anthrax and other diseases of stock.

Dr. Annett arrived in St. Vincent on December 19 and remained until January 14. During his visit to St. Vincent he has had opportunities of making a complete survey of the distribution of anthrax in the island.

In the course of an address to the members of the Agricultural Society on January 14, Dr. Annett gave an account of the condition of the stock in the island and urged the stock owners, who must, he said, look this matter fully in the face, to co-operate with the Government in carrying out the recommendations he was about to make. The great seriousness of the matter called for energetic action, and if such recommendations were thoroughly carried out he was convinced that anthrax might be stamped out.



### Antigua Stock Farm.

It is announced in the *Leeward Islands Gazette* that those desirous of retaining the services of the animals at the Government Stock Farm are invited to make known their requirements.

The animals are: Jack donkey 'Orphan Boy' (fee 15s. for each service); stallion 'Michael' (fee 10s.); Mysore bull (fee 5s.); half-bred short-horn bull 'Canada' (fee 3s.); Berkshire boar (fee 2s.). Cockerels of improved breeds can be obtained at the farm at 10s. per bird.

Persons desirous of retaining the services of the above-mentioned animals are requested to send their names to Mr. W. J. Abbott, at Skerrett's. It is stated that it is impossible to continue the expense connected with the maintenance of the stud animals unless there is reasonable hope that persons using them will contribute a fair share of the cost.

### Rubber Trees in Ceylon.

The following information is taken from an article in *Nature*, for December 27, 1906, by Dr. J. C. Willis:—

In the middle of 1906 there were in Ceylon more than 104,000 acres of land planted in rubber, almost solely Para rubber. Ceara rubber (*Manihot Glaziovii*) was largely planted about twenty years ago, but never realized expectations, though the export of its rubber has not actually ceased. *Castilloa elastica* grows with great rapidity at first, but then slows down, and although it yields freely at first tapping, it has no wound response, and dies if too severely handled. Consequently it has been planted only on a small scale.

Para rubber, on the other hand, seems to grow freely up to a small elevation in any part of 'wet' Ceylon, and can be roughly handled without, as far as can be seen, suffering any serious injury. None of the other rubber-yielding trees has given remunerative returns.

### Selection of Tobacco Seed.

The Tobacco Expert of the Agricultural Department of Victoria, Australia, gives the following directions with regard to saving tobacco seed so as to improve the variety, or to prevent its deterioration.

Plants should be selected for the following qualities:—

(1) Purity of type; (2) Size, shape, and number of leaves; (3) Size and position of mid-ribs and veins; (4) Early ripening; (5) Curing properties; (6) Easy working in regard to suckering, etc.; (7) Healthy seed.

Since self-fertilized plants yield more vigorous seed than cross-fertilized, the central cluster of buds on the selected plants should, if there is any probability of cross-fertilization, be covered with a muslin bag before the flowers open. The other branches and buds should be removed.

Plants which grow a large number of leaves are those which produce the best wrappers. One healthy tobacco plant will, if properly treated, provide enough seed to plant 25 to 50 acres. The lower leaves of the selected plants may be removed as they ripen, and cured.

### How to grow Fuchsias in the West Indies.

These plants can be obtained in the fall of the year from dealers in Europe and America. They should have been severely cut back to the woody stems and be allowed ventilation in transit. On arrival they should be put in sandy soil in the smallest pots until they have made roots and shoots. They might be shaded by an east or west wall, as half a day's sun is quite enough for them. They should be transplanted into 3- or 4- inch pots, well drained by crocks and cocoa-nut fibre at the bottom, and containing a mixture of one-third loam, one-third sand, and one-third thoroughly rotten pen manure. They can be fed, when necessary, by a liquid manure made by dissolving  $\frac{1}{4}$  oz. of potassium or ammonium phosphate and  $\frac{1}{4}$  oz. of nitre in 1 gallon of water. This should be used, as a rule, instead of water, when watering the pots.

If a great show of flowers at once is required, e.g., for table decoration, all the flower-buds should be nipped off for some weeks, when no larger than a pin's head. This enables the plant to store up food, and when the flower-buds are finally allowed to grow, a surprisingly large number of flowers open at once. Both the single and double kinds will flower in the West Indies. The plants will not succeed in full sunshine, nor in full shade, but can flower on a verandah where they get sun nearly half the day, or when shielded by wire gauze. Their culture should only be attempted by those who are experienced in growing plants in pots successfully.

### Cacao in Cuba.

A consular report on the cacao industry in Cuba published in the *West India Committee Circular*, for December 4, 1906, states that an approximate estimate gives the cacao production of Cuba for 1905 as 5,200,000 lb., of which 3,897,704 lb. were exported. The province of Santiago de Cuba is the principal cacao-producing district in Cuba. Sloping ground, with rich, deep soil, is generally chosen for the plantation, and cacao is usually planted in conjunction with coffee, as the former does not yield until seven or eight years after planting, whereas coffee gives a half crop in the third year, and a full crop thereafter.

When the cacao trees attain a large size, and the coffee yield begins to fall off, the coffee trees can be cut down. Coffee is usually planted in rows 5 to 6 feet apart, and cacao in rows 15 to 18 feet apart. The cacao is planted direct from the seed, and the variety called Caracas is preferred. Some planters put in rows of *Castilloa* rubber, 30 to 40 feet apart. This tree can be tapped in from ten to twelve years. While the cacao, coffee, and rubber are growing up, corn, bananas, cassava, etc., are cultivated between the rows. Uncleared land costs from £1 to £3 per acre. Clearing and burning cost £3. The further expenses for the first year (planting cacao and coffee) would be approximately £7 16s. per acre. Coffee in Cuba is subject to an import duty of 8s. per lb., and so that grown locally commands the market. The cacao is exported to the United States, Spain, France, Holland, Great Britain and possessions, Mexico, etc., in order of values.





## INSECT NOTES.

### Keeping Citrus Trees free from Insect Pests.

During the recent visit to Jamaica of the delegates to the Agricultural Conference, opportunity was given for visiting various estates and cultivations. One of the most interesting of these was the citrus cultivation of Dr. Tillman at Camden Park, in Vere.

This plantation was established some seven years ago, and when visited by the delegates, was in an excellent state of cultivation. A good system of irrigation is maintained, and the freedom of the trees from insect pests gave ample proof of the usefulness of good methods of cultivation in their control.

About three or four years ago scale insects were somewhat troublesome. Thorough spraying with kerosene emulsion served greatly to reduce the number of these pests, and since then, a rather original plan has been adopted for keeping the trees free from scale insects. When the trees have finished bearing, they are pruned, and all leaves that show the presence of the mussel shell scale (*Mytilaspis citricola*) are picked or cut off, and the stems and branches of the trees are washed with kerosene emulsion, which is applied by means of a sponge or soft cloth. By this means the trees are kept free from scales at a very moderate outlay of time and money.

### Arrowroot Worm.

In a recent Bulletin (No. 54) of the Bureau of Entomology, U. S. Department of Agriculture, an account is given, with illustrations, of the larva and adult of the larger canna leaf-roller (*Calpodex ethlius*) which is known in the West Indies as the canna worm or the arrowroot worm, and was the subject of a note in the *Agricultural News*, Vol. IV, p. 74.

During the past two years, this insect has been a serious pest in the Southern States, attacking principally the bronze varieties of cannas and tannias (*Caladium esculentum*).

Spraying with arsenate of lead and Bordeaux mixture is recommended as a remedy, and a word of caution is given in regard to the use of arsenicals in dealing with this insect, occurring as it does on ornamental plants where children are likely to be about.

The natural enemies of this insect seem not to occur in the Southern States, especially the small hymenopterous parasite of the eggs, to which no doubt, is due the comparative scarcity of the arrowroot worm in most years in the West Indies.

### Toads and Cotton Worms.

In a previous number of the *Agricultural News* (Vol. III, p. 362) mention was made of the common toad (*Bufo agui*) of the West Indies and of its habit of feeding on many of the common insects which attack the various crops.

In addition to the insects mentioned in the note referred to, as forming food for the toad, the cotton worm is now known to be readily eaten by it. Large numbers of toads may be seen in any cotton field in which the worm occurs, and by watching them quietly for a time one may see them picking up any worms that drop to the ground. The toads do not notice a cotton worm that lies quiet, but they are very quick to observe any that are crawling along and pick them up with remarkable rapidity.

In a cotton field in Barbados recently, where the worm was more than usually abundant, large numbers of toads had assembled, as many as eight or ten being in sight at one time. When the plants were jarred and the worms shaken to the ground, the latter were quickly snapped up by the toads. Cotton worms were thrown to several toads; one took twelve, another ten, and others took nearly as many. There would seem to be no danger of the toads being poisoned by eating the worms that are killed by Paris green, since only those worms are eaten that are quite active when they are on the ground.

### DOMINICA AGRICULTURAL SCHOOL.

The following is the general report of the examiner (Mr. F. A. Stockdale, B.A.) on the recent half-yearly examination of the pupils of the Dominica Agricultural School:—

Of the eighteen pupils who sat for this examination, three took the papers set for the senior class, eleven the junior papers, and four are new boys. The work of the school, on the whole, is very satisfactory, and continued progress is being made.

The answers sent in by the senior class were of a very uniform character, and clearly show that the boys have a good grasp of their subjects. A. F. Pinard came out top of the examination with 78 per cent. of the total marks, while Cuffy, who held this position in the last examination, has descended to third, owing to carelessness in Agriculture and a poor essay. All the boys obtained full marks in Arithmetic, the working being neat and clear. Agriculture is the weakest subject, but the question dealing with the budding of oranges was answered well, and showed that it was thoroughly understood. Some improvement is noticed in Chemistry and Botany, although several careless blunders, presumably due to lack of forethought, were made. Of the eleven juniors, two, as in the last examination, obtained over 70 per cent. of the total marks, and only one obtained less than half marks. The average percentage of marks obtained per boy in this class was 63, as against 59 in the last examination. Devin, Dupigny, and Wilson sent in some good papers, but the last is weak in Agriculture. Lawrence has fallen back to last but one, his science subjects still being weak.

The Arithmetic is again good, the papers, for the most part, being neat. Attention should be given to Agriculture and Chemistry. In the former subject a few boys spent too much time over the question dealing with budding of oranges, with the result that they did not do themselves nor their teaching justice in the other questions. Three of the new boys have made a satisfactory beginning, but the fourth is rather weak. Care should be taken with the spelling and writing of these boys before they are pushed on to science subjects.

I have now to report that the tendency to learn off notes of lectures by heart has almost entirely disappeared, but care should still be taken, as it is desirable to teach the boys to think and reason for themselves.



## CITRATE OF LIME FROM SEYCHELLES.

The following report, by Professor Wyndham R. Dunstan, F.R.S., on a sample of citrate of lime from Seychelles, to which reference was recently made in the *Agricultural News* (Vol. VI, p. 8), is likely to be of interest in view of the increasing attention being paid to this product in the West Indies:—

A sample of citrate of lime manufactured in the island of Silhouette was forwarded to the Imperial Institute by the Curator of the Botanic Station, Seychelles, and is referred to in a letter from the Governor, dated January 6, 1906, in which a report on the value of the product was requested.

*Description of Sample.*—The sample consisted of 1 lb. of a pale grey powder which had a slight pleasant odour. When moistened, the citrate of lime showed a faint greyish orange-brown colour, and it gave a yellow solution when dissolved in water.

*Examination of Sample.*—The substance was examined in the Scientific and Technical Department of the Imperial Institute, and was found to contain 84.56 per cent. of citrate of lime (calcium citrate) and 0.42 per cent. of free acid, calculated as citric acid, these constituents being together equivalent to 66.89 per cent. of crystallized citric acid. It contained a small quantity of iron salt, equivalent to 0.7 per cent. of ferric oxide, and also a little nitrogenous and mucilaginous organic matter. The proportion of moisture, including water of crystallization, was 12.57 per cent.

The analytical results show that this sample of citrate of lime is of good quality, and that it contains very little organic impurity in the form of mucilaginous or colouring matter. No excess of calcium carbonate is present, but the amount of ferric oxide is rather high, owing, probably, to the use of impure chalk in the preparation of the product. Care should be taken to use a white chalk, free from rusty patches, for the neutralization of juice. The amount of moisture is also rather high, viz., 12.57 per cent. Air-dried citrate of lime ought to contain only about 7 to 8 per cent. of moisture, and it is desirable that this percentage should not be greatly exceeded in commercial consignments.

*Commercial Valuation.*—A portion of the sample was submitted to a large firm of manufacturing chemists in London who use considerable quantities of citrate of lime. This firm reported that the quality of the product is extremely good, especially as regards colour, percentage of citric acid, and freedom from lime and mucilage. In these respects it is superior to many commercial samples. The chief defect is that more iron is present than usual, but, as already pointed out, this can be easily remedied in future by carefully selecting the chalk used for neutralizing the juice.

The present value of citrate of lime is £70 per ton. This is a higher figure than has prevailed for a long time; the normal value is £45 per ton delivered in London.

*Conclusions and Recommendations.*—It is clear from these results that this sample of citrate of lime from Seychelles is of good quality, and compares very favourably with the material at present on the market. It would be desirable to prepare a commercial consignment of the product, taking precautions to avoid the presence of iron, and to forward this for sale in London, so that it could be brought to the notice of manufacturers, and its value definitely determined. It is of the highest importance that the citrate should be thoroughly dry before being shipped in bulk, as the effect of any dampness is to permit fermentation, which, in some cases, will go on to such an extent that a substance shipped as citrate of lime arrives at its destination in the form of impure carbonate.

## COCOA-NUTS IN EAST AFRICA.

The following is an abstract of a paper by a cocoa-nut planter in East Africa, published in the *Tropenpflanzer*, for April 1905:—

The cocoa-nut palm will produce small returns, and will be liable to diseases, unless planted on a permeable soil. Soil and subsoil should be of light loam, for only meagre returns can be expected if the palm is grown in mere sand. Palms in sand are also very liable to be blown down by high winds.

Cocoa-nuts for seed must be quite dry in the husk before they are gathered. They should be about half full of water when planted, and every cocoa-nut planted should be tested beforehand by shaking. The best position of the nut in the soil is nearly horizontal, with the stem end somewhat raised. The depth of earth over the nut should at most be  $1\frac{3}{4}$  to 2 inches. Water should be supplied to the seed-beds directly any leaves begin to turn yellow. The leaves appear in two or three months, and the young palm can be planted out when it is one year old. The roots should be cut off fairly short, and the upper halves of the leaves cut off. The holes in which the seedlings are planted out may be 20 inches deep and wide, filled in with surface soil. They should be no less than 30 feet distant from one another. The plants are to be set out at the beginning of the rainy season. The plantation should be kept clean by hoeing, and the weeds left to rot.

The rotting of the heart, or terminal bud, is contagious. It is probably due to a bacterium. At the very first sign of this disease (viz., the tip of the terminal bud turning yellowish red), the palms affected must be at once taken out and burnt. But in a suitable soil and a clean plantation the damage done by this disease is practically insignificant. In my experience I have found the cocoa-nut palm one of the most profitable plants in German East Africa. A properly cared-for tree has, I find, an average of 100 ripe nuts per year. The ripe nuts are husked, split across, and put for two days in the sun to dry. Then the dry endosperm is removed from the shell, and left for one to one and a half days in the sun, being protected from rain. The dry copra is then shipped to Europe. The fibres of the husk can be used for cordage, while the shells make a good fuel.

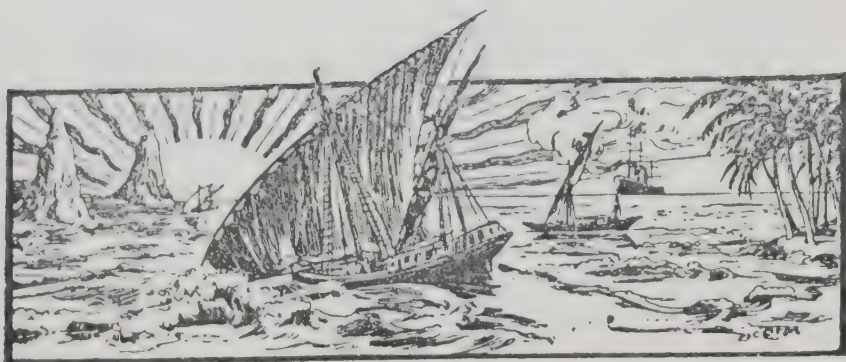
## DEPARTMENT NEWS.

The Imperial Commissioner of Agriculture for the West Indies, accompanied by Mr. H. A. Ballou, M.Sc. (the Entomologist), Mr. F. A. Stockdale, B.A. (Mycologist), and Mr. A. G. Howell (Chief Clerk), of the staff of the Imperial Department of Agriculture, returned to Barbados from Jamaica in S.S. 'Port Kingston' on Monday, January 21.

Mr. W. R. Buttenshaw, M.A., B.Sc., Scientific Assistant on the staff of the Imperial Department of Agriculture, accompanied the delegation from the British Cotton-growing Association on their visit to St. Vincent in S.S. 'Ocamo' on January 8, and returned to Barbados in R.M.S. 'Esk' on January 15.

The Secretary of State for India has offered Mr. W. R. Buttenshaw, M.A., B.Sc., Scientific Assistant on the staff of the Imperial Department of Agriculture for the West Indies, an appointment as Botanist in the Indian Agricultural Service. Mr. Buttenshaw will vacate his present position as soon as his successor has been appointed.





## GLEANINGS.

Molascuit (a food for horses and cattle) is on sale at the office of the St. Lucia Usines & Estates Company, Ltd., at 5s. per bag. Mixed with half of oats it makes a cheap and very nourishing horse food. (*St. Lucia Voice*, January 10, 1907.)

The making of jippi-jappa hats in Jamaica has increased greatly, but has been confined practically to one corner of the island. The local demand has increased owing to purchases by tourists. There is plenty of room for more hat making in the colony. (*Journal of the Jamaica Agricultural Society*.)

The report of the Board of Agriculture in British Guiana for 1905-6 states that the rate of increase in the area under cacao has been higher than usual. 'In view of the fact that there are in the lower reaches of the rivers of the colony great tracts of fertile land well suited for cacao cultivation, this increase of its development is very welcome.'

According to the *Cotton Trade Journal*, of Savannah, the ginners' reports show that up to December 13, 1906, 49,330 bales of Sea Island cotton were ginned, against 90,836 bales to the same time last year; 85,728 bales in 1904; and 59,248 bales in 1903. It is thought that these figures indicate a maximum crop of 58,000 to 65,000 bales.

By the provisions of the Importation of Plant Diseases Prevention Ordinance, St. Vincent, 1906, 'all plants and packages thereof shall, as soon as possible after their importation into this colony, be delivered up by the importer to the Treasurer, who shall cause them to be conveyed, without delay, to a place of fumigation and disinfection, there to be dealt with by the Agricultural Authority.'

The value of the fertilizers imported by Japan for 1905 was more than £2,250,000. They were chiefly sulphate of ammonia, cotton cake, and phosphates. The latter especially are in great demand, and the factories which prepare super-phosphate from the imported mineral are being enlarged. Phosphates seem specially useful in Japanese agriculture. Before 1895 very little fertilizer was imported. (*Japan Weekly Chronicle*.)

Mr. A. D. Hall, of the Rothamsted Experimental Station, in an article on the liming of land, in the *Journal of the Board of Agriculture*, says that Rothamsted had been, for the most part, heavily limed in former times when labour was cheap. Its continuous fertility was attributable to this. But the rain dissolves and carries off a large amount every year. It is considered that  $\frac{1}{2}$  ton per acre would be profitably applied to most lands poor in lime, every year or once in each three years. It was usually applied in the form of chalk.

The office of Curator of the Botanical Stations in the Gold Coast is now vacant. The officer appointed would be required to carry out the usual duties of a Curator in tropical colonies, to instruct and advise native cultivators, etc. Salary, £250 a year, rising to £300 by annual increments of £10.

All the shares in the Antigua Cotton Factory, Ltd., have been allotted locally, and almost entirely amongst those who have embarked already in the cotton-planting industry. Our best wishes are given to the company; the Directors are all business men, who will, no doubt, steer the newly launched endeavour so successfully that the shares will, before long, be a valuable asset saleable at a high premium. (*Antigua Standard*.)

The *Bulletin* of the Trinidad Botanical Department gives results of experiments which show that it takes at least ten years to produce a fair-sized clump of bamboos which would stand regular cutting once in two years. The new stems of the giant bamboo at the early period of the season of growth were observed to grow 12 inches in a day. Frequent cutting results in the death of the stools, and even cutting once in two years gradually weakens them.

The Curator of the Botanical Garden at Palmerston in the northern territory of South Australia reports: 'Last season I had twelve varieties of cotton under cultivation in the garden with the most satisfactory results. The Sea Island and Egyptian varieties have proved themselves thoroughly adapted to the soil and climate, and where such varieties can be successfully grown, it would be folly to cultivate for profit any less valuable kind. For this reason I have planted only Sea Island and Egyptian varieties this season.'

A comparative return giving the quantities and values of the exports of Jamaica during the quarter ended September 30, 1906, and the corresponding period in 1905, shows that double the quantity of cacao was exported, the values being £20,333 and £7,540, respectively. Of grape fruits 8,964 packages were exported, as compared with 3,573; the value of the sugar and rum was £48,645, as against £27,241. The exports of tobacco and cigars show a very large increase.

The *Transvaal Agricultural Journal*, for October, contains a reference to broom corn. Brooms cost locally about double the price for which they sell at San Francisco, where there is a flourishing industry in broom corn. A broom factory has been established near Capetown requiring 100 tons of broom corn heads annually. The point is noted that the young seedlings are often choked by weeds and that this can be prevented by previously growing a cleaning crop on the land, such as potatoes or velvet beans.

According to the *Consular Report* on the Philippine Islands for 1905, for the first time since the occupation of the islands by the United States, the value of the exports exceeded that of the imports. This was due to the increase of the exports of Manila hemp, sugar, copra, and leaf tobacco, together with a decreased importation of rice, more of which is grown locally. The chief exports were: Manila hemp, valued at £4,331,469; raw sugar, £1,015,374; copra, £648,940; leaf tobacco, £273,824; and cigars, £178,512. Rice still constitutes more than one-fifth of the total value of imports.



## IMPROVEMENT OF CACAO PLANTATIONS IN ST. LUCIA.

The following is taken from a leaflet circulated in St. Lucia by the Agricultural Superintendent:—

Statistical evidence indicates that the cacao plantations of St. Lucia are not yielding, on the average, more than about 300 lb. of cured cacao per acre, whereas, with improvement, they are, in most instances, where the trees are of full bearing age, capable of yielding from 600 lb. to 1,000 lb. per acre. This means that instead of the proprietor reaping, as at present, an average profit of about £5 per acre, he might, with ordinary expenditure of energy in the direction of improved methods of culture, and a moderate outlay of £5 to £6 per acre, be soon reaping a profit of £10 to £20 per acre per annum. It is, however, desirable to remember that for intensive cultivation to be profitable, it should be continuously, and not occasionally practised.

Even young unbearing cacao trees will repay good culture, which means continuous attention to their requirements as regards the condition of the soil, and the maintenance of conditions above ground that will be conducive to the health and vigour of the plants. The improvement of bearing plantations will generally lie in the direction of better drainage, pruning, forking, and, possibly, manuring and shading. Just what treatment may be most desirable in each case can be decided only after careful consideration of the conditions of each plantation. In cases of uncertainty as to the line of improvement most suitable, planters and peasant proprietors are invited to communicate with the Agricultural Superintendent or the Agricultural Instructor; either of these officers will be pleased to advise in such matters.

Experiments in the improvement of neglected cacao plantations in St. Lucia have been in progress, under the direction of the Imperial Department of Agriculture for the West Indies, during the past six years, and the information obtained as to the results of these experiments should be very useful to planters as an indication of the lines upon which efforts should be directed with the object of increasing the vigour and productiveness of cacao plantations. It has therefore been decided to circulate the following extracts from the annual reports of the Agricultural Instructor, showing the results obtained on cacao experiment plots at Soufrière and Dennery, and directing attention to matters of interest to cacao growers.

For detailed information as to these experiments readers are referred to the annual reports. The following brief summary of the extracts reprinted with the above may be of interest:—

(1) The Soufrière plot, 1 acre of cacao trees, seven years old, was taken over by the Agricultural Department in 1901, when the yield of cacao was nil, and the trees were diseased and failing. In 1905-6, the yield was 1,081 lb. of cured cacao, which realized £27 0s. 6d., the working expenses for that year, including manures, being £2 19s.

(2) Dennery plot, Beauséjour estate, had for years been one of the ugliest fields of cacao on the main road between Dennery and Castries, and had borne scarcely any crop. The first manures were applied in February 1901. In 1902-3, it produced 1,100 lb. of dry cured cacao, worth £25. The cost of cultivation for this year was £4 6s. 6d., including £1 8s. 8d. for sulphate of potash which was not applied.

(3) Thirty-eight acres of old trees were manured and cultivated at Errard estate, beginning in 1903. The average crop for the previous six years had been 333 lb. per acre. The average crop in 1904-5 was 631 lb. Of the 38 acres, 20 had been manured for only one year. The net profit, by

cultivating and manuring, for 1904-5, was £180 over and above the average crop reaped before manuring was commenced.

During 1905-6 the exports of cacao from St. Lucia were about 1,900,000 lb. from an estimated area of 6,165 acres, showing an average yield throughout the island of about 300 lb. per acre. The history of these experiment plots shows distinctly that planters should have no difficulty in doubling or trebling this output. Much poverty among cacao planters is due to the fact that they get 300 lb. of cacao per acre, value £6 5s. (at 5d. per lb. for badly cured), when they should be getting, with a slightly increased rate of expenditure, 600 lb. to 1,000 lb. of well-cured cacao, of the value of £15 to £25. In the one case an acre of cacao yields an income of £4 5s., while in the other it shows a profit of £15.

Hundreds of little points should be seen to by the owner, and nothing which conduces to the welfare of his trees can be neglected, if maximum crops are aimed at.

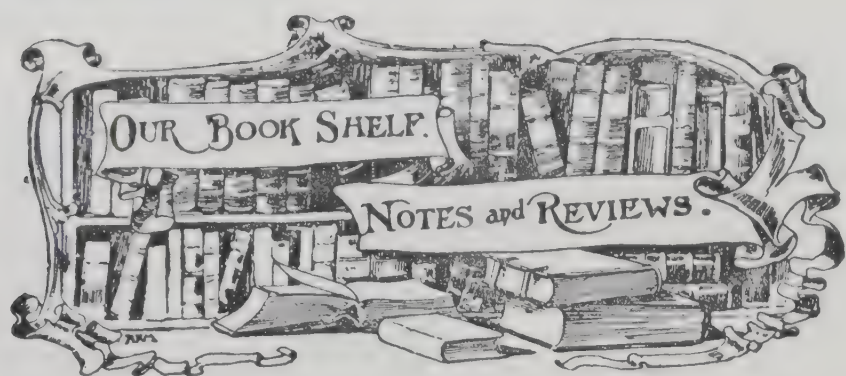
## NEW CANADIAN TARIFF.

The *Maritime Merchant* makes the following reference to the effect of the new Canadian tariff on West Indian trade. Extracts from this tariff were given in the *Agricultural News*, Vol. VI, p. 15:—

The new Canadian tariff on sugar is slightly more favourable to the West Indies than heretofore, as it practically adds about 5c. per 100 lb. to the preference given British raw sugars. The rate of duty has been increased 7c. per 100 lb. on British grown sugar, and 12c. per 100 lb. on foreign sugars. The new tariff is as follows: British grown, 34c. per 100 lb. for 75° or under, and 1c. for each degree over 75°; foreign grown, 52c. per 100 lb. for 75°, and 1½c. for each additional degree. On refined the tariff is unchanged, being: British, 72c. per 100 lb. for 88° or under, and 1c. for each additional degree; foreign, \$1.08 per 100 lb., and 1½c. for each additional degree above 88°. Molasses, the produce of any British country entitled to the benefit of the British preference, is continued on the free list, and it is provided that it shall be imported direct by vessel from the islands of production. Such molasses may test up to 50° by the polariscope. This is to cover fancy molasses imported from Barbados. As respects foreign molasses, the duties have been advanced as follows: Formerly, molasses 40° and over paid 1¾c. per gallon, and for each degree below 40°, and not less than 35°, an additional duty of 1c. per gallon, molasses below 35° being dutiable at ¾c. per lb. The new tariff provides that such non-British molasses, not less than 30° nor more than 56°, shall pay 3c. per gallon. The duty on glucose and syrups has been reduced to: British, 30c. per 100 lb., and foreign, 50c. per 100 lb., as against the old tariff of—British, 50c., and foreign, 75c. per 100 lb.

The tariff on cacao has been changed with a view of encouraging the importation of the crude product from the West Indies and discouraging the importation of the foreign manufactured article. The duty on cacao shells and nibs of British growth has been reduced from 13½ per cent. to 7½ per cent.; cacao paste or liquor, and chocolate paste or liquor, not sweetened, entitled to the preference, have been reduced from 2½c. per lb. to 2½c. per lb. The duty on cacao or chocolate in powder form has been increased from 13½ per cent. to 15 per cent., while preparations of cacao or chocolate, not otherwise specified, have been increased from 13½ per cent. to 25 per cent. when from British countries, and from 20 to 35 per cent. when from countries not entitled to the preference.





**INDIAN INSECT PESTS:** By H. Maxwell-Lefroy, M.A., F.E.S., F.Z.S. Calcutta: Government Printing Office, 1906. Price, 2s.

This attractive volume of over 300 quarto pages should prove extremely useful as a simple and practical work for planters and others engaged in agriculture in India. In the preface the author states that he has 'tried to give a short account of the general features of the lives of insects, as well as the salient facts concerning our destructive pests.'

The illustrations are good and numerous. The text is in simple language with as few technical terms as possible. The pests of each principal crop are dealt with as such, and the different groups of insects are arranged according to the habit, manner of feeding, etc. There are two appendices giving directions for collecting, setting, and pinning insects.

The chapters on insecticides give directions for preparing and using all the standard preparations for dealing with different pests, while that on 'Insecticides and Spraying' describes several forms of spraying machines.

It will be remembered that Mr. Maxwell-Lefroy was formerly Entomologist on the staff of the Imperial Department of Agriculture, and did useful work in connexion with these colonies.

**THE WORLD'S COMMERCIAL PRODUCTS:** By W. G. Freeman, B.Sc., F.L.S., and S. E. Chandler, D.Sc., F.L.S. London: Sir Isaac Pitman & Sons, Ltd., 1, Amen Corner, E.C. In twelve fortnightly parts. Price 7d. each part.

The object of this 'descriptive account of the economic plants of the world and of their commercial uses' is similar to that of the *Atlas of the World's Commerce*, which was reviewed in the *Agricultural News*, Vol. V, p. 222. This is stated to be: 'to arouse a wide-spread interest among the English-speaking race as to the every-day objects with which they are brought into contact—to tell them what they are, whence they came, and how they are raised.'

Each part contains a coloured plate, and the whole work is profusely illustrated. The world's commercial products are arranged in this work in natural groups. The first and second parts are devoted mainly to the cereals—wheat, barley, oats, rice, maize, and millet; in the third and fourth parts starch and sugar are dealt with. Then follow articles on rubber, resins, tans, and dyes, which contain information of a complete and up-to-date character. All the other principal products are to be dealt with in a similar manner.

The whole work is therefore 'a complete guide to knowledge of the economic plants of the world and their commercial uses, and teaches the great truths of science in the plainest of language.' The results of personal observations in many parts of the world, contributions from experts engaged daily in handling the products under consideration, and the consultation of standard authorities have been blended to make the volume as far as practicable a concise and simple account of the chief plant products of the world.'

**BACTERIA IN RELATION TO PLANT DISEASES,** Vol. I: By Edwin F. Smith. Washington, D.C., 1905.

The first volume of this work deals with the methods used in the Laboratory of Plant Pathology, U. S. Department of Agriculture, for the study of bacterial diseases of plants, the nomenclature and classification of bacteria, formulae for making stains and culture media, and a bibliography, that covers the general field of bacteriology, with the exception of plant diseases, this division being reserved for the second volume.

The study of bacterial diseases of plants has only recently come to the fore, and the list of bacteria capable of attacking the higher plants increases rapidly from day to day. The author, in the preface to this volume, urges all workers on bacteria in relation to plant diseases to study carefully bacteriological methods and the requirements of modern pathology before commencing research, as many papers on this branch of plant pathology have been published which have brought the whole subject into disrepute. It must, however, be urged that the large amount of half-finished work on bacterial plant diseases has been due to the lack of just such a guide as is given by this volume.

It is pointed out that before any disease can be said to be due to bacteria, the following points must be established: (a) constant association of the organism with the disease; (b) isolation of the organism from diseased tissues and careful study in culture media; (c) production of characteristic signs of the disease by inoculations from pure cultures; and (d) discovery of the organism in the inoculated, diseased plants, re-isolation of the same and further growth on various culture media.

The publication is well illustrated, many of the cuts showing the effect of bacteria upon plant tissue, among which are included bacterial disease of tomato plants, tobacco wilt, bacterial disease of broom corn, and the angular leaf spot of cotton.

## INFLUENCE OF FORESTS ON WATER SUPPLY.

*Forest Bulletin* (No. 9), issued by the Government of India, deals with this subject, which is also one of great importance in certain of the Antilles. The following points seem to be those that are most applicable to the circumstances of the West Indies:—

(1) In some cases the rainfall in a forest seems to have been somewhat greater than that on bare ground at the same level, but in other cases this is doubtful.

(2) Mountains cause rain by blocking the wind, and forcing the air to rise up their slopes to colder heights.

(3) Mountain forests seem to condense a certain amount of water from the air, which would be lost if the mountain were bare.

(4) It is probable that forests may feed some springs.

(5) The flow of surface water is arrested on forest-covered slopes, and so washing out of gullies is checked.

(6) A mountain forest acts as a reservoir to feed a river. A certain quantity of rain can be held for a time in the dead leaves, stems, etc., on the ground, and trickles down slowly instead of forming a torrent.

(7) Where the forests at the head of the rivers are destroyed, the channels are swollen with sudden and destructive floods at every heavy rainfall, and become nearly or quite dry at every dry season.

(8) Cattle, especially goats, will in time destroy a forest by killing the seedling trees.



## WEST INDIAN PRODUCTS.

### Drugs and Spices in the London Market.

The following report on the London drug and spice market, for the month of November 1906, has been received from Mr. J. R. Jackson, A.L.S.:—

The spice and drug market during the month of November has maintained a steady interest, with fair demands at normal to increasing prices for most articles affecting the West Indies. Spices, perhaps, rather than actual drugs, are usually more in evidence as the season of Christmas approaches, and spices generally had an upward tendency.

#### GINGER.

At the first sale, on the 7th., Jamaica realized rather higher prices, the 30 barrels offered selling without reserve at 59s. 6d. for good ordinary, and 56s. for wormy; 270 packages of Cochin were offered and bought in, unsorted native cut at 53s., and small cut at 45s. A week later, 110 packages of Jamaica were offered and disposed of at 64s. for middling, 59s. for small washed, and 57s. to 57s. 6d. for good common. Of 600 packages of Cochin and Calicut offered, 60 bags were sold. On the 21st., Jamaica was in good demand, and was sold at somewhat higher rates as follows: Dull fair washed, 63s. 6d. to 65s. 6d., and common at 56s. Some 900 packages of Cochin and Calicut were offered, and 460 bags of washed Cochin sold at 26s. 6d. and 29s. to 30s. At the last sale 50 barrels of Jamaica were offered, and 12 sold at steady rates, 65s. being paid for low middling.

#### NUTMEGS, MACE, AND PIMENTO.

At the auction on the 7th., nutmegs and mace were both in fair demand at steady rates. On the 14th., there was a quiet but steady sale, the offerings being very small, fair West Indian mace selling at 1s. 5d. In these spices little or no change occurred during the remainder of the month. Of pimento, 300 bags were offered on the 14th., and 60 disposed of at 2½d. for fair quality. This price was maintained at the sale on the 21st., 120 bags being offered and 20 sold. On the 28th., 50 bags were offered and bought in at 2¾d. to 3d. per lb.

#### ARROWROOT.

There was a steady sale in this article throughout the month. At the first spice sale, on the 7th., fair manufacturing St. Vincent realized 2¼d. to 2¾d., at which rates 120 barrels were sold out of 500 barrels offered. A week later the offerings consisted only of a few cases of Natal, which were bought in at 3¼d. On the 21st., there were again no offerings of St. Vincent, but 4 cases of Natal sold without reserve at 3d. On the 28th., no arrowroot was offered by auction; but some private sales were effected of 80 barrels of St. Vincent at 2¾d., and fine manufacturing at 3¾d. per lb.

#### SARSAPARILLA.

At the first drug auction all the offerings realized full prices at the following quotations: grey Jamaica, fair to good fibrous, 2s. 1d. to 2s. 2d.; roughish, 2s. 1d., native Jamaica, sea-damaged, 5d. to 6d.; 1 bale of native yellow realized 11d., and 14 bales of Lima-Jamaica, good sound rolled, 1s. 7d. to 1s. 9d., and sea-damaged, 1s. 2d. to 1s. 4d. A week later, the quotations were in limited quantity, grey Jamaica, 2s. 4d., and Lima-Jamaica, 1s. 9d. Honduras, which was reported very scarce, was quoted at 1s. 8d.

#### KOLA, LIME JUICE, AND CHILLIES.

At the first spice sale, some 95 packages of kola, good bold bright, natural Jamaica halves, were offered, and 64 sold at from 2d. to 3d., and slightly mouldy and dull at 2¼d. to 2½d. per lb. On the 21st., 4 barrels of Ceylon, dark mouldy, realized 2d. per lb., good bright being bought in at 4d. Fair pale raw West Indian lime juice, in hogsheads, found buyers at 1s. per gallon; brown, in barrels, realized 10d., and ordinary dark 6d. per gallon. On the 21st., a case of West Indian distilled oil of lime realized 2s. 1d. per lb. Chillies at this sale sold at 16s. for mixed Mombasa and Zanzibar, and 80 bags of long, thin, red, Java capsicums realized 21s.

### RUBBER-BEARING MISTLETOS.

The following information is abstracted from the *Tropenpflanzer*, for November 1905:—

Two or more mistletos of tropical South America have fruits in which the usual viscin around the seed is replaced by a thick layer of sticky caoutchouc emulsion, which serves the same purpose as viscin in the transport of the seeds by birds. This rubber is not contained in latex tubes, and coagulates spontaneously when the fruits are dried.

The large-fruited mistletoe is *Loranthus syringaeifolius*. It grows in tropical Brazil, British Guiana, and Venezuela. In the last-named country the fruit ripens in the last three months of the year. The fresh fruits are  $\frac{3}{8}$  inch long and  $\frac{1}{4}$  inch broad. In Venezuela it is parasitic on the Ingas, used as shade trees for coffee. These coffee plantations are often 3,000 feet high, and this mistletoe has been met with up to 4,600 feet. Its seeds are transported by a very shy, large, wild dove, and so it is not met with near habitations. The Director of the Venezuelan railway obtained 1.7 lb. of rubber from 8 lb. of dry fruit, and considered that a yield of 15 per cent. of pure rubber can confidently be reckoned upon. An analysis of dry fruits in Berlin gave 15.02 per cent. of pure caoutchouc which vulcanized well, and 11.35 of resin. In June 1905, rubber from this mistletoe was priced at from 3s. 2d. to 3s. 6d. per lb. Some trees covered with the mistletoe have produced 2 cwt. of dry fruits in one season. To obtain the rubber, the dry fruits are crushed with mills or stamps, and the fibre, etc. washed away from the lumps of rubber. The unripe fruits may also be crushed between rollers, washed on sieves, and the rubber emulsion in the liquid coagulated by boiling.

*Loranthus marginatus* also contains rubber.

Another rubber-bearing mistletoe is *Loranthus Theobromae*, which is found in the region of the Amazon, in British Guiana, and Venezuela. It is a very common parasite, and grows on Inga, mango, and especially on cacao and coffee. It has clasping air-roots. Unripe fruits gave 5 to 10 per cent. of pure rubber, which would mean about twice this percentage from the dry fruits. It is intended to propagate this mistletoe in Venezuela on abandoned cacao and coffee plantations. One coffee plantation already produces four times as much mistletoe berries as coffee, from the natural spread of the parasite. It is reckoned that several thousand tons of wild mistletoe rubber may be obtained in the next few years from Guiana, Venezuela, and Brazil.

These parasites can easily be planted on shade trees, etc., by leaving ripe fruits for two weeks in the shade, and then placing them in cuts in the bark of the host plants. The smaller mistletoe, *L. Theobromae*, only needs for propagation that a piece of stem, with sucking roots, should be tied to a branch of the host.



## MARKET REPORTS.

London,—January 1, 1907. 'THE WEST INDIA COMMITTEE CIRCULAR,' Messrs. KEARTON, PIPER & Co.; Messrs. E. A. DE PASS & Co., December 29, 1906; 'THE LIVERPOOL COTTON ASSOCIATION WEEKLY CIRCULAR,' December 28; and 'THE PUBLIC LEDGER,' December 29, 1906.

ALOE—Barbados, 15/- to 60/-; Curaçoa, 18/- to 56/- per cwt.  
 ARROWROOT—St. Vincent, 2½d. to 2¾d. per lb.  
 BALATA—Sheet, 1/6 to 2/-; block, 1/6 to 1/7 per lb.  
 BEES'-WAX—£7 10s. to £8 per cwt.  
 CACAO—Trinidad, 85/- to 94/- per cwt.; Grenada, 76/- to 80/- per cwt.  
 CARDAMOMS—Mysore, 8d. to 3/4 per lb.  
 COFFEE—Jamaica, good to fine ordinary, 40/- to 44/- per cwt.  
 COTTON—Good medium, 6.50d.; West Indian Sea Island, good medium, 18½d.; medium fine, 19½d.; fine, 21d.; extra fine, 25d. per lb.  
 FRUIT—  
 GRAPE FRUIT—7/- to 8/- per box.  
 BANANAS—Jamaica, 4/- to 6/- per bunch.  
 ORANGES—8/- to 9/- per box.  
 PINE-APPLES—St. Michael's, 1/6 to 3/6 each.  
 FUSTIC—£4 5s. to £4 15s. per ton.  
 GINGER—Jamaica, common, 56/- to 58/-; middling to fine, 62/- to 85/- per cwt.  
 HONEY—16/- to 28/- per cwt.  
 ISINGLASS—West Indian lump, 2/- to 2/4; cake, 1/1 per lb.  
 KOLA NUTS—2½d. to 6d. per lb.  
 LIME JUICE—Raw, 10d. to 1/1 per gallon; concentrated, £21 10s. to £21 12s. 6d. per cask of 108 gallons; hand pressed, 3/- per lb. Distilled Oil, 2/- to 2/2 per lb.  
 LOGWOOD—£4 to £4 10s.; roots, £3 10s. to £4 per ton.  
 MACE—Fair reddish and palish, 1/2 to 1/5 per lb.  
 NITRATE OF SODA—Agricultural, £12 10s. per ton.  
 NUTMEGS—62's, 1/9; 68's, 1/2; 74's, 10½d.; 84's, 9d.; 93's, 7½d.; 100's, 6½d.; 109's, 6d.; 120's, 5d. per lb.  
 PIMENTO—Fair, 2½d. to 2¾d. per lb.  
 RUM—Jamaica, 2/3; Demerara, 1/2 to 1/3½ per proof gallon.  
 SUGAR—Yellow crystals, 16/6 to 17/6 per cwt.; Muscovado, 14/- to 15/- per cwt.; Molasses, 11/6 to 12/- per cwt.  
 SULPHATE OF AMMONIA—£11 15s. per ton.

Montreal,—December 7, 1906.—Mr. J. RUSSELL MURRAY.  
 (In bond quotations, c. & f.)

COCOA-NUTS—Jamaica, \$28.00 to \$29.00; Trinidad, \$26.00 per M.  
 COFFEE—Jamaica, medium, 10c. to 12c. per lb.  
 GINGER—Jamaica, unbleached, 13c. per lb.  
 MOLASSES—Barbados, 26c. to 27c.; Antigua, 22c. per Imperial gallon.  
 NUTMEGS—Grenada, 110's, 15c. to 15½c. per lb.  
 ORANGES—Jamaica, 10/-.  
 PIMENTO—Jamaica, 5½c. per lb.  
 SUGAR—Grey crystals, 96°, \$2.25 to \$2.35 per 100 lb.  
 —Muscovados, 89°, \$1.75 per 100 lb.  
 —Barbados grocery, \$2.20 to \$2.30 per 100 lb.

New York,—January 11, 1907.—Messrs. GILLESPIE BROS. & Co.

CACAO—Caracas, 18c. to 19½c.; Grenada, 17½c. to 18c.; Trinidad, 18c. to 19c.; Jamaica, 15c. to 16½c. per lb.  
 COCOA-NUTS—Jamaica, \$22.00 to \$23.00; Trinidad, \$21.00 to \$22.00 per M.  
 COFFEE—Jamaica ordinary, 7¼c. to 8c.; good ordinary, 8½c. per lb.  
 GINGER—Dark scraggy root, 10c. to 11c.; small to bright bold, 12c. to 14c. per lb.  
 GOAT SKINS—Jamaica, Antigua, and Barbados, 59c. to 61c.; St. Kitt's, St. Thomas, and St. Croix, dry flint, 50c. to 51c. per lb.

GRAPE FRUIT—Jamaica, \$2.75 to \$3.25 per barrel; \$1.50 to \$2.00 per box.  
 HONEY—Jamaica, 72c. per gallon.  
 LIMES—No quotations.  
 MACE—35c. per lb.  
 NUTMEGS—85's to 90's, 16c.; 95's to 100's, 16c.; 100's to 110's, 13c.; 130's, 12c.  
 ORANGES—Jamaica, \$3.25 to \$3.75 per barrel; \$1.75 to \$2.00 per box.  
 PIMENTO—5½c. per lb.  
 SUGAR—Centrifugals, 96°, 3.50c. to 3.55c.; Muscovados, 89°, 3c. to 3.05c.; Molasses, 89°, 2.75c. to 2.80c. per lb. duty paid.

## INTER-COLONIAL MARKETS.

Barbados,—January 14, 1907.—Messrs. T. S. GARRAWAY & Co., and Messrs. JAMES A. LYNCH & Co., January 15, 1907.

ARROWROOT—St. Vincent, \$3.80 to \$4.75 per 100 lb.  
 CACAO—Dominica, \$12.00 per 100 lb.  
 COCOA-NUTS—\$12.00 per M. for husked nuts.  
 COFFEE—\$10.25 to \$11.00 per 100 lb.  
 HAY—85c. to 90c. per 100 lb.  
 MANURES—Nitrate of soda, \$65.00; Ohlendorff's dissolved guano, \$55.00; Cotton manure, \$42.00; Cacao manure, \$42.00 to \$45.00; Sulphate of ammonia, \$75.00; Sulphate of potash, \$67.00 per ton.  
 ONIONS—Madeira, \$5.50 to \$6.00 per 100 lb.  
 POTATOS, ENGLISH—Nova Scotia, \$1.90 to \$2.00 per 160 lb.  
 RICE—Ballam, \$5.40 to \$6.00 per bag (190 lb.); Patna, \$3.00 to \$3.75; Rangoon, \$2.70 to \$2.75 per 100 lb.  
 SUGAR—No quotations.

British Guiana,—January 19, 1907.—Messrs. WIETING & RICHTER.

ARROWROOT—St. Vincent, no quotations.  
 BALATA—Venezuela block, 25c.; Demerara sheet, 38c. per lb.  
 CACAO—Native, 15c. to 16c. per lb.  
 CASSAVA—60c. per barrel.  
 CASSAVA STARCH—\$5.75 per barrel.  
 COCOA-NUTS—\$10.00 to \$12.00 per M.  
 COFFEE—Creole, 14c. to 15c. per lb.  
 DHAL—\$4.25 to \$4.35 per bag of 168 lb.  
 EDDOS—\$1.20 to \$1.68 per barrel.  
 MOLASSES—16½c. per gallon.  
 ONIONS—Madeira, 4c. to 4½c. per lb.  
 PLANTAINS—20c. to 40c. per bunch.  
 POTATOS, ENGLISH—Nova Scotia, \$2.75 to \$3.00 per barrel.  
 POTATOS, SWEET—Barbados, \$1.00 per bag.  
 RICE—Ballam, \$5.90 to \$6.10 per 177 lb.; Creole, \$4.75 to \$4.80 per bag (ex store).  
 SPLIT PEAS—\$6.00 per bag (210 lb.).  
 TANNIAS—\$2.00 per barrel.  
 YAMS—White, \$2.16; Buck, \$1.92 per bag.  
 SUGAR—Dark crystals, \$2.00 to \$2.10; Yellow, \$2.50 to \$2.60; White, \$3.50 to \$3.60; Molasses, \$1.40 to \$1.75 per 100 lb. (retail).  
 TIMBER—Greenheart, 32c. to 55c. per cubic foot.  
 WALLABA SHINGLES—\$3.00, \$3.75, and \$5.25 per M.

Trinidad,—January 12, 1907.—Messrs. GORDON, GRANT & Co.

CACAO—Ordinary to good red, \$18.25 to \$18.50; estates, \$19.00 per fanega (110 lb.); Venezuelan, \$18.50 to \$19.00.  
 COCOA-NUTS—\$21.00 per M., f.o.b.  
 COCOA-NUT OIL—75c. per Imperial gallon (cask included).  
 COPRA—\$4.25 to \$4.50 per 100 lb.  
 DHAL—\$4.35 to \$4.40 per 2-bushel bag.  
 ONIONS—\$3.00 to \$4.00 per 100 lb. (retail).  
 POTATOS, ENGLISH—80c. to \$1.25 per 100 lb.  
 RICE—Yellow, \$5.40 to \$5.75; White, \$5.60 to \$5.75 per bag.  
 SPLIT PEAS—\$5.40 to \$5.50 per bag.  
 SUGAR—Yellow crystals, \$2.25 to \$2.50; molasses, \$2.00 to \$2.25 per 100 lb.





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## West Indian Agricultural Conference, 1907.

THE President and Representatives of the sixth West Indian Agricultural Conference arrived at Kingston, Jamaica, in the Imperial Direct West Indian Steamship 'Port Kingston' at day-break on Friday, January 11, when

they were met by his Excellency the Governor, the members of the Reception Committee, and a large number of the principal officials, men of business, and planters of the island.

Arrangements had been made for a number of excursions to various parts of the island. One party paid a visit to St. Catherine to see the banana, rubber, and citrus cultivations and the cassava starch factory at Eltham Park. The Vere district was visited by another party, where opportunities were obtained of seeing banana cultivation under irrigation, and the cotton cultivation of the Vere Estates Co., Ltd. After the sugar works at Money Musk had been inspected, the party proceeded to the citrus grove of Dr. Tillman at Camden, which is probably the best of its kind in the West Indies. On the return journey, the representatives were able to see the new central sugar factory which is in course of being erected at Parnassus.

On the following day most of the delegates availed themselves of an invitation to visit Port Antonio as guests of the Hotel Titchfield. The special train by which the party travelled made stops at Highgate and Orange Bay to enable the visitors to inspect banana and cacao cultivations. A ball was given at the Hotel Titchfield on Saturday evening, and the visitors returned to Kingston the following day.

On Sunday, January 13, a special service was held at the Kingston Parish Church, when his Grace the Archbishop of the West Indies was the preacher. A report of his Grace's sermon appears on p. 46 of this issue.



On Monday, January 14, the Conference was opened at the Old Mico School-room in Kingston, by his Excellency the Governor, Sir Alexander Swettenham, K.C.M.G., who expressed his great pleasure in welcoming to Jamaica the Conference delegates and the influential and distinguished company brought out by Sir Alfred Jones. Conferences of this kind were, he declared, amongst the agencies which made for the progress of the West Indies, and he hoped their deliberations would be fruitful of benefit to those concerned.

Sir Daniel Morris then delivered his presidential address. He said it was a source of satisfaction to him that it had been possible to arrange for this Conference to be held in Jamaica, where he had spent some of the best years of his life, and in which he continued to take deep interest. Probably, in no part of the tropics could be found such diversified industries as existed in Jamaica, and it was, in consequence, singularly favourable as a meeting place for those interested in agriculture. He referred gratefully to the thoughtful arrangements made by the Reception Committee, which had afforded the delegates opportunities of becoming acquainted at first hand with some of the special industries of Jamaica.

In the course of a review of the agricultural conditions of the West Indies since the last Conference, held in Trinidad in January 1905, the President stated that progress was being made in every direction. New industries were being added, and old industries were being revived and developed. Referring to the general anxiety felt throughout the colonies where sugar is a staple, as to whether the Brussels Sugar Convention was likely to be continued, he announced that after careful consideration he had decided to appoint a committee consisting of representatives closely connected with the industry, which would prepare replies to the following questions: (1) What has been the effect of the Convention in the West Indies? (2) What effect has the recent uncertainty as to its continuance had? (3) What would be the probable effect of its non-continuance? The report would be likely to be of value when the question of the continuance of the Convention was under consideration in the Mother Country. Attention was also drawn to the position and prospects of West Indian sugar in the Canadian market. This was followed by a review of efforts to extend the cultivation of cacao and citrus fruits in Jamaica. The value of cacao exported from Jamaica in 1906 was £75,000; of citrus fruits, £99,689.

In regard to the cotton industry, the President

pointed with reasonable pride to the rapid progress that had been made during the last four years. There were now 18,000 acres in the islands under cultivation in cotton; of this, 15,000 acres were planted with the best varieties of Sea Island cotton that commanded the highest prices on the English market. The value of the cotton lint and seed exported from the West Indies was estimated at £200,000. References were also made to the rice industry of British Guiana, now of the annual value of about £218,000, and the cultivation of rubber trees in British Guiana, Trinidad, and Tobago; also to the prospects of extending the Jamaica tobacco industry and of the preparation of cassava starch on a commercial scale.

In conclusion, Sir Daniel Morris referred to the future of the Imperial Department of Agriculture and the decision arrived at by the Home Government to continue the grant to a moderate extent for a further period of five years. Progressive contributions by the colonies would be necessary if it was proposed to continue the work on the present lines; further, an understanding might be arrived at as to the practicability of establishing a central authority in agriculture for the whole of the West Indies.

A vote of thanks to the President for his address was proposed by his Grace the Archbishop of the West Indies, who expressed his gratification at the change that had taken place in the mental attitude towards agriculture in these colonies. The Imperial Department of Agriculture had, he said, brought about an identity of feeling as regards the value of improvement and the necessity of promoting industries by dealing with them in a manner at once practical and scientific. The resolution was seconded by the Hon. B. Howell Jones (British Guiana), who stated that the Imperial Department of Agriculture had grown into an organization of vast importance and of great necessity to these colonies. In acknowledging the vote of thanks, Sir Daniel Morris referred to the valuable and loyal services rendered by Dr. Francis Watts, C.M.G., Mr. J. R. Bovell, F.L.S., and the other officers of the Department.

As has already been briefly stated in the *Agricultural News*, the deliberations of the Conference were brought to a sudden close during the first day of the session by the disastrous earthquake which overwhelmed Kingston and neighbourhood on January 14.

It is in contemplation to proceed with the publication of the papers prepared for the Jamaica Conference in the *West Indian Bulletin* at an early date.



## SUGAR INDUSTRY.

### Cane Farming in Trinidad.

The Warden of the Naparima Ward of Trinidad makes the following reference to the sugar crop in his annual report for 1905-6 :—

The sugar crop this year was a failure. Heavy rains fell during the months of June, July, and August, and after this very dry weather set in to the end of the year. The consequence was that an unprecedented short crop was reaped. As an offset to this, however, the price of sugar rose to the highest point it has been known to rise to for many years, but I doubt very much whether the high prices obtained will make up for the deficient crop.

Cane farmers were in the same position as the planters. The canes they produced, with few exceptions, were miserable specimens, and nothing else can be expected if they will continue to persist to cultivate—if it can be called cultivating—in the manner they do, and that is one or two weedings, no manuring, little or no draining, and continuous re-cropping. In some parts of the district, the degeneration of the canes on account of this style of cultivation is so perceptible that one can safely predict that in a few years the land will produce nothing but grass. On the other hand, in other parts of the district where manure was used by the farmers, and the land properly tilled, the contrast was striking.

At the beginning of the crop the price paid to farmers for their canes was 9s. per ton, but as the season advanced the price steadily rose, and towards the end of the crop 14s. was readily paid all round.

In my last report I drew attention to the danger some cane farmers were running by growing canes at inordinately long distances from factories. One would have imagined that experience would have taught them the folly of continuing to cultivate canes under such a disadvantage, but apparently not, for they seem to be going further afield, which means courting disaster.

The farmers produced 11,838 tons of canes less this year than they did last year, and they obtained \$61,354 more for them. Cane farmers have been steadily increasing in number for years past. In 1903-4, there were 3,792 of them engaged in this pursuit; in 1904-5, they increased to 4,591, and this year they number 5,009—2,980 East Indians and 2,029 West Indians.

### Sugar in Fiji.

The following is extracted from the *Annual Colonial Report on Fiji* for 1905 :—

The cultivation of sugar forms the staple agricultural industry of the colony. There are at present six sugar mills in the colony, of which four are owned by the Colonial Sugar Refining Company, Ltd., of Sydney. The mill in the Navua district, owned by the Fiji Sugar Company, has recently changed hands and is now the property of the Vancouver-Fiji Sugar Company. It is proposed to erect a new mill and extend considerably operations in this district. The total area of land under cane cultivation is estimated at 40,012 acres, from which were produced during 1905, 396,090 tons of cane. The total area of cultivated land in the colony (exclusive of native cultivation) is estimated at 72,672 acres.

There has been a further increase in the exportation of sugar, due to increased cultivation. The exports amounted to 58,488 tons, valued at £539,594, as compared with 52,138 tons, valued at £469,391, in 1904.

### The Sugar-cane in the West Indies.

The *West India Committee Circular*, of January 15, suggests that the sugar-cane is indigenous to the West Indies and quotes Dr. Moseley from his *Treatise on Sugar* as follows: 'On the discovery of the western hemisphere, the sugar-cane was found on the continent, and also on some of the islands, but the art of making sugar, it is said, was never practised by the aborigines of the West India Islands until they were settled by Europeans, nor by the Mexicans, Peruvians, or any other native inhabitants of South America previous to their subjugation by the Spaniards, although there might be some doubt on this head with respect to Mexico.'

This was written in 1799; later information seems to indicate that the East was the native home of the sugar-cane.

Ritter, writing about 1840, notes that all the varieties of cane known in a wild state, and belonging to the genus *Saccharum*, grew in India, with the exception of one found in Egypt, and further states that 'the probability is entirely in favour of the origin in Asia, if one can draw a conclusion from botanical geography.'

De Candolle, in *The Origin of Cultivated Plants*, 1882, says 'the sugar-cane is cultivated at the present day in all the warm regions of the globe, but a number of historical facts testify that it was first grown in Southern Asia, whence it spread into Africa, and later into America.' The following extract from the *Lectures to Sugar Planters*, p. 3, gives the probable history of the sugar-cane to the time of its introduction into the West Indies :—

'The native home of the sugar-cane is still a matter of doubt, but evidence, on the whole, seems to point to India or some of the islands of the Pacific as being the region from which it was originally obtained. From this it has spread or been carried to China and Arabia; afterwards, it was introduced by the Arabs to Sicily and Southern Spain, where it is still cultivated to a moderate extent.

'From Southern Spain it was taken by the Portuguese to Madeira, whence, in 1503, it was introduced to the Canary Islands. It was in the Canaries that slave labour first became associated with the cultivation of the sugar-cane. From the Canary Islands it is said to have been carried to Brazil early in the sixteenth century.

'The sugar-cane was brought to the West Indies in or about 1520 by Columbus and was established in Hispaniola (San Domingo), Martinique, and Guadeloupe.'

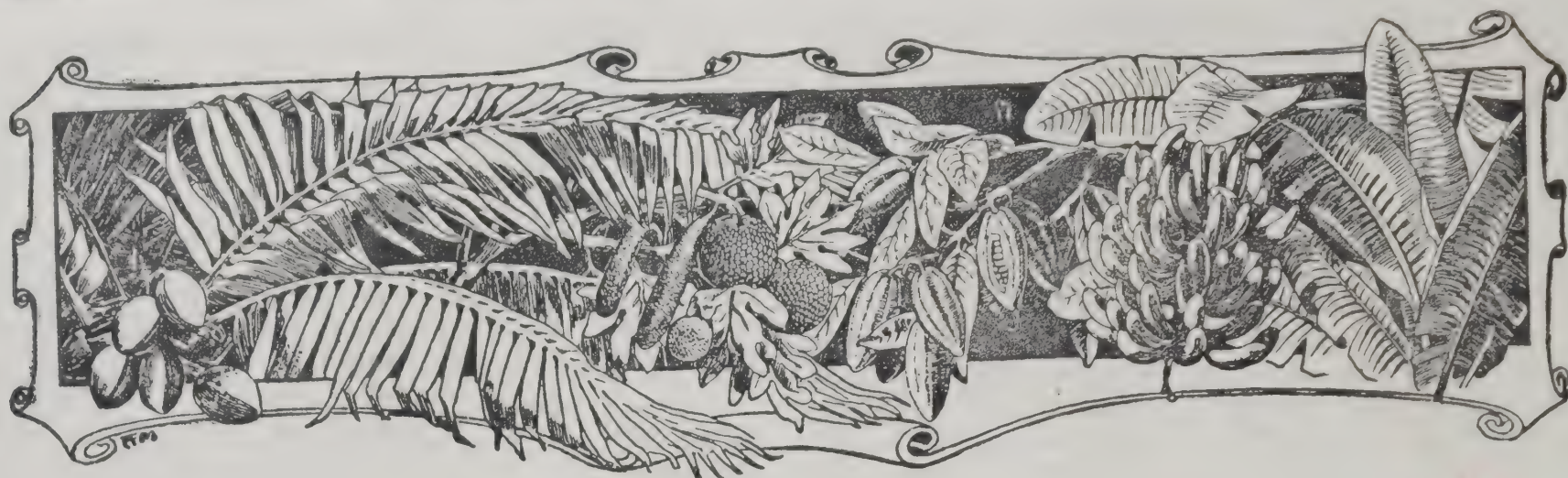
This view is also held by Stubbs, for he states that the sugar-cane was introduced in San Domingo after the discovery of the New World and was afterwards taken from that island into Louisiana.

### PROPAGATION BY CUTTINGS.

In many cases there is a difficulty in rooting cuttings of certain plants. An observance of some or all of the following points will often bring success in the West Indies :—

- (1) Choose young wood on which buds are visible.
- (2) Soak the ends of the cuttings in strong Bordeaux mixture.
- (3) Ring the stem, where the cutting is to be made, and leave it until a callus is formed before removing it.
- (4) Use fresh washed sand from the beach to put the cuttings in.





## WEST INDIAN FRUIT.

### DATE PALMS IN JAMAICA.

It is stated in the report on the Department of Public Gardens and Plantations in Jamaica, for 1905-6, that three of the date palms planted in the Hope Gardens in 1901 fruited during the year.

Pollen-bearing flowers were tied up at the top of each bunch as soon as the spathe opened and disclosed the female flowers. Fertilization took place, and perfect fruits were formed. The greater part of the fruit was removed before ripening, as the trees are still very young. The fruit that was left was of good quality.

Thirty-one suckers were distributed during the year free, on the understanding that the Director of Public Gardens should have a claim on all suckers produced by them, if they were wanted for further distribution.

It is stated: 'The date palm requires great heat, a dry atmosphere, and a sandy soil. Another requisite is a constant abundance of water at the roots; the water may be brackish, but it should not be stagnant. When planted out 25 to 30 feet apart, they require protection by a fence, and should be tied at first to a strong post to prevent them from being blown over.'

### PROPAGATING CHOICE MANGOS.

In the *Florida Agriculturist*, for December 12, 1906, Mr. John B. Beach, who has had an extensive experience in propagating East Indian mangos, describes the results of his work as follows:—

(1) Cuttings inarched on the roots of a stump (Gale method) properly inserted at the right season will seldom fail to unite.

(2) As many as 90 per cent. of buds have taken and every conceivable method of budding has been tried.

(3) Side grafts or sprig buds may have 40 per cent. of successes.

(4) True grafts may unite in 20 per cent. of cases.

(5) Inarching of stems properly done will give 100 per cent. of perfectly healthy vigorous trees, which may be shipped or planted out in two or six months, while methods 1, 2, 3, and 4 require that the plants should be kept a year longer in the nursery in order to become properly vigorous. For nursery trees inarching is the only practical method of propagation. In Florida pot-grown inarched trees have, after planting out, borne a heavy crop of fruit in three years. In Jamaica they seem to grow faster and take longer to bear.

### PREVENTING THE DECAY OF RIPE FRUIT.

The following results of experiments conducted at Kew are described in the *Journal of the Board of Agriculture*, for December 1906. It seems not unlikely that bananas, oranges, grape fruit, mangos, etc., treated in this inexpensive way, might be shipped to England or New York in a sound condition without the use of ice:—

Ripe fruit rots because of the growth of fungus spores on its skin into the body of the fruit. These fungi grow in most easily through any minute cut or bruised spot. If most of the spores on the skin of the fruit are killed, the fruit will not rot so soon. Commercial solution of formalin was mixed with about thirty times as much water and the fruit dipped into it for ten minutes. Bananas thus treated and exposed to the air remained sound for ten days longer than untreated bananas. If oranges were treated in this way, and then wrapped in paper, it seems probable that the access of fresh spores to them would be prevented and they might last longer still. This treatment was proved in the case of apples completely to stop rotting which had just commenced. It is highly recommended as one means of preserving in a sound state tropical fruits during their transit to temperate countries. On a larger scale 10 gallons of water and 3 pints of formalin are put in a cask, and the fruit, in a sack of netting, is lowered in for ten minutes, and then set aside to drain. The solution does not deteriorate, but may be used again and again until it is practically all gone.

Previous experiments at Kew were described in the *Agricultural News* (Vol. IV, p. 277).

### DOMINICA PLANTERS' ASSOCIATION.

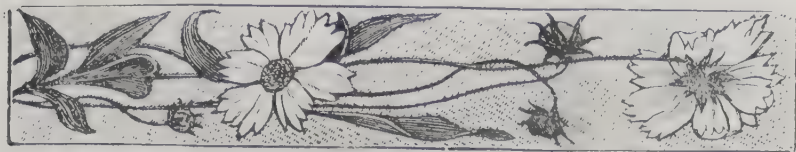
The annual general meeting of the above association was held on December 22 last, when the following committee and officers were elected for the ensuing year: Chairman, H. A. Frampton, Esq., M.L.C.; Vice-chairman, E. A. Agar, Esq.; Honorary Secretary and Treasurer, G. G. Downing, Esq.; Committee, the Hon. J. C. Macintyre, M.E.C.; J. Cox Fillan, Esq., M.L.C.; A. K. Agar, Esq., W. D. Riviera, Esq., and L. L. Bell, Esq.

The meeting was well attended and the members discussed various matters freely.

In response to the invitation of Sir Daniel Morris, the Hon. J. C. Macintyre, M.E.C., and J. Cox Fillan, Esq., M.L.C., were appointed the association's delegates to attend the Agricultural Conference in Jamaica in January 1907.

*Extract. See under mango 23/1/07*





## PAINLESS DESTRUCTION OF ANIMALS.

In a leaflet issued by the Royal Society for the Prevention of Cruelty to Animals, the following directions are given for the painless destruction of dogs, cats, and other pets:—

It is occasionally necessary, either through age or disease, to destroy favourite animals, and the most painless method is always desired. In such cases one of three processes is recommended: (1) Poisoning by prussic acid, (2) inhalation of chloroform, (3) drowning by experienced persons. When prussic acid is used, Scheele's strength should be employed. The dose for large dogs is 2 drams, and for small ones or cats, 1 dram. The mouth should be opened, and the draught given direct from the bottle. When the animal is ferocious, it should be induced to seize a stick with its teeth, and the acid can then be easily injected with a syringe. Objection is often raised to the use of this acid, as it is supposed to cause pain; this I doubt, for the animal is dead in half a minute, provided the acid is of the proper quality. When chloroform is employed, the animal's head should be tied up in a bag or cloth, and the chloroform sprinkled on the part covering the nose. This method generally ensures a painless death.

Drowning, when properly carried out, is attended by very little pain, death taking place very quickly. The animal should be placed in a basket or bag, and plunged into a tub or bucket filled with water, and kept under the surface of the water by means of a weighted second tub or bucket, which fits the first tub or bucket 2 inches at least below the surface of the water, and thus prevents the admission of air.

Old dogs are easily destroyed by an overdose of hydrated chloral, which induces a heavy sleep from which the animal never awakes. It is impossible to conceive of an easier death than this. Dose for small dog, 2 drams; for large dogs,  $\frac{1}{2}$  oz., dissolved in water.

### RABBITS.

The best way to kill rabbits is to take the hind legs in the left hand, so as to allow the head to hang downwards. While in that position, a smart blow is struck just behind the ear with a walking-stick, which causes instantaneous death. When the rabbit is very large a second blow is advisable. The jugular, or large veins of the neck, may then be cut through with a penknife, and the body hung up to bleed. Just dividing the veins of the neck without first killing the animal is a very cruel and slow death.

### PIGEONS, FOWLS, DUCKS, GEESE, AND TURKEYS.

The quickest and most painless way of destroying any of these birds, is to break or dislocate the neck, all sense of feeling being immediately removed. The struggling which follows is not a result of pain, but of reflex action.

The operation is carried out in the following manner: The head is taken in the right hand with the thumb against the back of it, the neck being seized with the left hand, then with a quick jerk with the right hand, the thumb being pressed downwards at the same time, the vertebrae are dislocated. Another method is to strike a sharp blow on the back of the neck with a heavy stick. Whichever process is adopted, the body may be afterwards hung up, and the large veins of the neck divided. The bird bleeds just as freely with this method as when it is bled to death without the neck being dislocated.

## ST. LUCIA AGRICULTURAL SCHOOL.

The following is the general report of the examiner (Mr. F. A. Stockdale, B.A.) on the recent half-yearly examination of the pupils of the St. Lucia Agricultural School:—

Nineteen boys sat for the examination; five took the papers set for the senior class, and there were fourteen juniors.

DuBoulay maintains his position at the top of the seniors, some of his answers being good. The papers sent in by the other four seniors were uniform, and clearly show that the Science subjects are much better than Geography and Composition. The improvement made in Agriculture during the first half of the year has been maintained, and Botany is also now in a much better position than it was at the last examination. Chemistry is satisfactory. I have again to report that Geography is weak, and that it cannot be noticed that map drawing, which, it was pointed out in my last report, should receive attention, has much improved. Composition is only fair, the essays being totally wanting in style.

Of the fourteen juniors, only two obtained over 50 per cent. The Science subjects have improved somewhat, particularly Agriculture; but the Arithmetic, Geography, and Composition, are very weak, few boys ever obtaining more than half marks. In Arithmetic, many of the papers were poor, for the working was untidy, careless, and inaccurate. Extra time should undoubtedly be given to instruction in this subject, as considerable improvement will be expected in the next examination. In Geography, map drawing should receive attention. The maps should be of fair size, tidy, and of accurate outline. In Composition, improvement has been made in the arrangement of facts since the last examination, but the essays are still lacking in style.

In Agriculture, some good answers were sent in, especially on the budding of oranges, which showed that the boys take interest in their practical work at the Experiment Station attached to the school.

The Botany papers were fair, but the answers would have been materially improved if the facts had been arranged under sub-heads. In Chemistry, the papers were fairly satisfactory, but improvement could still be made, particularly in the matter of drawing of chemical apparatus.

Throughout the school it would appear that the boys are beginning to think and reason for themselves, for lecture notes do not now seem to be learnt off by heart.

## ANTHRAX IN BRITISH GUIANA.

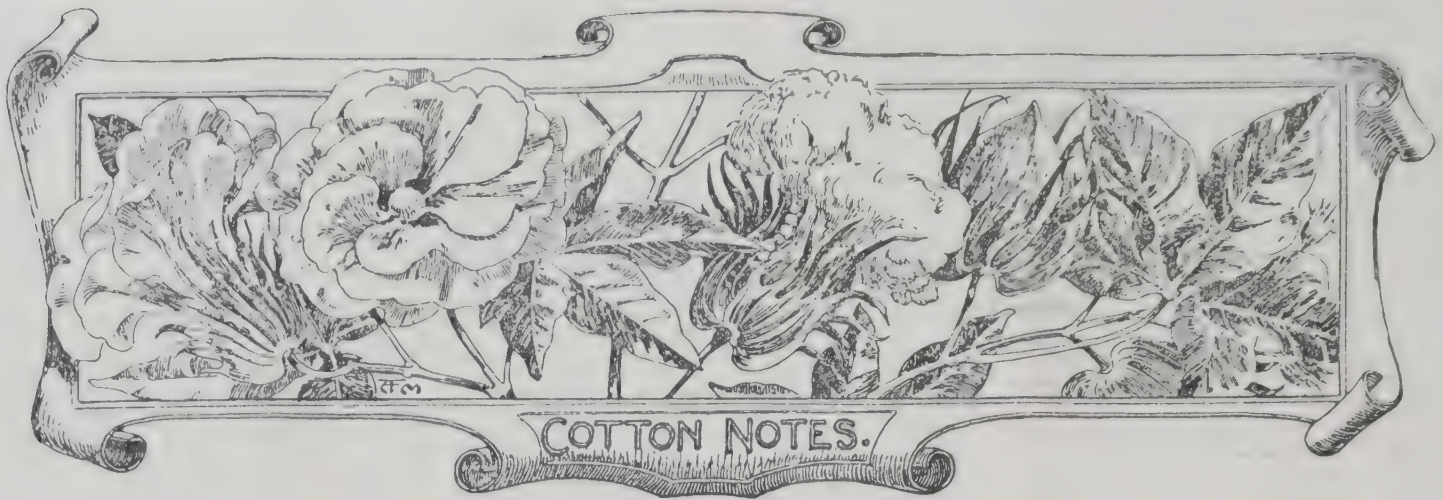
The Government Veterinary Surgeon in British Guiana states in his report for the year 1905-6:—

Since I introduced inoculation for anthrax in this colony, the death-rate has been considerably lessened. During the year there were seven outbreaks, all of which were speedily stamped out by isolation, inoculation, and burning the carcasses of animals dying within the infected areas. The memorable outbreak in Berbice gave excellent testimony as to the efficacy of vaccination; before the animals were vaccinated the death-rate ranged up to 100 head per month, and now we have a clean sheet.

Anthrax is still endemic in certain parts and only disappears during the rainy weather; by annual inoculation alone can we hope completely to eradicate it.

During the year seven areas were declared to be infected by anthrax. In all, 12,596 animals were vaccinated, of which 12,000 were in the Corentyne Coast district.





QUALITY OF WEST INDIAN COTTON.

The improvement in the quality of cotton produced this season in the West Indies is again very encouraging to the planters.

Mr. E. Lomas Oliver, during his recent visit, had an opportunity of examining samples from a number of the islands, and expressed the opinion that there was again a marked improvement. He was pleased with the improvement of some of the cotton from Nevis and Montserrat; one or two samples from these islands he spoke of as being very fine. St. Vincent is again producing an excellent quality, which is being very closely approached by good samples from St. Kitt's. Mr. Oliver was also very pleased with the samples from Barbados and Antigua.

As already reported, 1 bale of Barbados cotton recently sold for 2s. 4d. per lb. Antigua has now every prospect of producing first-class Sea Island cotton.

BARBADOS COTTON INDUSTRY.

The *West India Committee Circular*, of January 15, 1907, has the following: 'Recent accounts of the cotton industry in Barbados are not so promising, and it is not expected that much will ultimately be grown in this island except as a catch crop on sugar estates.'

With a view of dispelling an impression likely to be detrimental to the Barbados cotton industry, the following table is published which will show that during the last three years Barbados has exported 946,627 lb. of Sea Island cotton, the total value of lint and seed being £64,996. It should also be mentioned that little, if any, is grown as a catch crop; in fact, it is all grown as a main crop and receives the most careful attention throughout:—

A Statement showing the Growth of the Sea Island Cotton Industry of Barbados, for the years 1903-7.

Year.	Acres.	Bales.	Weight in pounds. (Lint.)	Yield per acre.	Average price per pound.	Value of lint and seed.
1903-4	800	642	187,945	337·50	15·48d.	£13,166
1904-5	1,647	806	279,264	169·56	14·55d.	£18,274
1905-6	2,000	1,210	479,418	239·71	15·20d.	£33,557
1906-7	5,000					

N.B.—The year is counted from October 1 in one year to September 30 in the following year.

WEST INDIAN SEA ISLAND COTTON INDUSTRY.

The following table shows the acreage in cotton in the West Indies for the present crop and the last, together with statistics as to yield, output, value of the industry, etc. It will be seen that there is a total area of 18,166 acres in cotton in the West Indies, of which 14,566 acres are in Sea Island cotton:—

	Value of lint and seed.	Av. price per pound.	Yield per acre in pounds.	Weight in pounds of lint.	Bales.	Acres.
	£33,557	15·20d.	239·71	479,418	1,210	2,000
	13,557	18d.	209·00	165,124	502	5,000
	8,400	5d.	86·47	311,298	1,018	3,600
	8,380	15d.	120·37	120,379	357	3,600
	8,364	13d.	70·68	120,168	557	1,500
	5,280	15d.	80·65	80,650	403	1,700
	6,522	14·2d.	142·78	99,948	508	1,800
	6,789	15d.	127·61	98,262	251	1,000
	400		174·39	6,975	33	700
	4,025		41·00	61,493	265	1,883
						770
						1,000
						40
						50
						1,500
						300

Island.	Year.	1905-6	1906-7
Barbados	...	...	...
St. Vincent	...	...	...
Grenada (Marie Galante)	...	...	...
St. Kitt's	...	...	...
Nevis	...	...	...
Anguilla	...	...	...
Antigua	...	...	...
Montserrat	...	...	...
Virgin Islands	...	...	...
Jamaica	...	...	...



## SEA ISLAND COTTON MARKET.

Messrs. Wolstenholme & Holland, of Liverpool, report as follows, under date of January 14, in regard to the Sea Island cotton market in England:—

Since our last report Sea Island descriptions have remained firm in price, but owing to the absence of stock, very little business has been done.

Factors in Charleston are holding for 25*d.* without success, and it is to be hoped that they will continue to do so until West Indians are sold. Buyers are not prepared to pay the above price, and are, therefore, awaiting the arrival of larger quantities of West Indian cotton.

## SEA ISLAND COTTON MARKET.

The 'Sea Island Cotton Report' of Messrs. Henry W. Frost & Co., of Charleston and Savannah, dated January 12, has the following:—

*Islands.*—There was a demand for the limited offerings of odd bags on a basis of tinged, 34*c.*; fine, 35*c.* to 36*c.*; fully fine to extra fine, 40*c.* The stock consists almost entirely of planters' crop lots which are held at 45*c.* to 60*c.*, and for which there has been no inquiry during the past week. However, the factors are very firm in their views and have refused to make any concessions to sell.

As it is very generally and confidently reported that there is very little cotton remaining to be ginned, it is thought that these figures indicate a crop below 60,000 bags. The general estimates are that the final outturn will be about 57,000 to 58,000 bags.

The shortage as regards the crop of 1905-6 will probably be about 63,870 bags.

A week later the same firm reports:—

*Islands.*—The sales this week included the small lots of odd bags classing fully fine to extra fine, and several small planters' crop lots which were ordered sold at 40*c.*, the buying being for the Northern Mills. And since the close of the Exchange Report a crop of 44 bags S. & D. was sold on private terms for England.

The unsold stock now consists almost entirely of planters' crops held at 43*c.* to 50*c.* and upwards, and stained and tinged cotton held at 30*c.* to 35*c.*

## MEDALS FOR COTTON GROWING IN THE WEST INDIES.

It is interesting to note, in connexion with the offer by Sir Alfred Jones, K. C. M. G., of medals for competition amongst Sea Island cotton growers in the West Indies, that the Society of Arts attempted, soon after its institution, to encourage, by means of the offer of medals, the growth of agriculture in the colonies. The following note occurs in the *Society's Journal*, of January 11, 1907:—

In 1768, a gold medal was offered for the best specimen, not less than 10 lb., of cotton produced in the British dominions in America, equal to the fine Brazilian cotton, to be produced with certificates of the place of growth, on or before the first Tuesday in January 1770.

This offer was annually repeated until 1777. In 1778, the gold medal was given to Mr. Andrew Bennet, of Tobago, for the best specimen of West India cotton. Mr. Bennet sent an account of his experiments and observations, which is printed in the *Transactions*, Vol. I, p. 254.

## SHIPPING WEST INDIAN COTTON.

During the recent visit to the West Indies of the delegation from the British Cotton-growing Association, Messrs. Hutton and Oliver strongly recommended that this year, when there is a scarcity of cotton, all cotton grown, of whatever quality, should be shipped, as even the poor qualities will fetch good prices owing to short supplies from the Southern States.

While thus recommending the shipment of all cotton, they also confirm the recommendations which have been made from time to time by the Department to give great attention to the grading of the various qualities. Stained and weak cotton should not be mixed with the best qualities, otherwise the value of the latter would be considerably reduced.

The cotton obtained from the tops of plants after pruning, or from plants which have been taken up at the end of the season, should be picked, but such cotton should under no circumstances be mixed with the general crop, as much of it is very weak.

Any cotton lying about the field, the yard, or the house should be carefully collected, and as much as possible of the foreign matter which may be mixed with it removed, both by hand and by carefully whipping it. This year all such cotton may sell, and the planter should bear in mind that the cleaner it is made, the higher will be the price paid for it.

## ST. VINCENT COTTON INDUSTRY.

The following is extracted from the *Annual Colonial Report* on St. Vincent for the year 1905-6:—

A distinct advance was made in the cultivation of Sea Island cotton. The total acreage planted was about 790 acres, which was actually less than in the previous year, but the land was more judiciously selected and the cultivation more cared for, with the result of a correspondingly better yield. Diseases did little damage. The crop of Sea Island cotton amounted to 338 bales, of an estimated weight of 121,680 lb., of which amount 121,174 lb. were ginned at the Central Cotton Factory by the Agricultural Department.

The prices realized were very satisfactory, a large number of the bales being sold at the rate of 20*d.* per lb. The value of cotton and cotton seed exported amounted to £8,282, and it thus now takes the second place in importance among St. Vincent exports. The encouragement afforded by this result has, I am glad to say, led to an appreciable further development of this valuable industry in the present year.

On two estates which were not completely devastated by the eruption the cultivation of cotton has been tried, and good-quality cotton has been produced, but the yield was not very high. The trial serves to show, however, that certain parts of the island will soon be capable of producing average crops, provided a system of deep cultivation and manuring is carried out.

The cotton ginnery erected in 1903-4 was again successfully worked by the officers of the Imperial Department of Agriculture, and the high price obtained for the St. Vincent lint is testimony to the care and attention bestowed on the ginning and preparation for export.

The disintegrator for crushing cotton seed, referred to in my last report, was not much used. A certain amount of seed from St. Vincent is sent to Barbados and returned crushed by the factory there, which offers special facilities and turns out a finer meal; but the use of cotton seed meal for feeding to the local stock has not as yet been adopted to any great extent, though strongly advocated by the Department.



## EDITORIAL NOTICES.

Letters and matter for publication, as well as all specimens for naming, should be addressed to the Commissioner, Imperial Department of Agriculture, Barbados.

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## Agricultural News

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VOL. VI. SATURDAY, FEBRUARY 9, 1907. No. 125.

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### NOTES AND COMMENTS.

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#### Contents of Present Issue.

A brief account of the West Indian Agricultural Conference at Jamaica is given in the editorial.

Notes on the growth of date palms in Jamaica and on the propagation of choice varieties of mangos appear on p. 36; also a note on the use of formalin in preventing the decay of ripe fruit.

The attention of cotton growers is directed to a number of interesting notes on the progress of the cotton industry in the West Indies, as well as the hints on shipping cotton (pp. 38-9).

Snails and slugs can be readily trapped in gardens with the aid of copper sulphate (p. 42). On the same page will be found a brief account of tarantulas.

On p. 43 will be found useful notes on the cultivation and tapping of *Castilloa* rubber trees.

The three recent departmental reports reviewed on p. 45 contain much that is of interest in connexion with agricultural progress in Jamaica and British Guiana.

A special service was held at the Kingston Parish Church in connexion with the Agricultural Conference at Jamaica, when his Grace the Archbishop for the West Indies was the preacher (p. 46).

Mr. Jackson's report on the London drug and spice market for December appears on p. 47.

#### Canadian Trade Delegation to the West Indies.

The arrangements for the proposed visit to the West Indies of the trade delegation from Canada were recently discussed in the *Agricultural News* (Vol. VI, p. 1). Further arrangements have since been made, and it is now probable that the four delegates from the Boards of Trade of Toronto, Montreal, St. Johns, and Halifax, will be accompanied by several prominent merchants who are interested in the West Indies.

The delegation will arrive at St. Kitt's in the S.S. 'Olenda' on February 23. It is proposed to hold meetings in several islands at which the 'Olenda' touches, as also in British Guiana. It is evident that a cordial reception will be given to the delegates throughout the West Indies, and it is anticipated that their visit will be productive of good results.

It is proposed in Trinidad that, in addition to holding a business meeting, the delegation will visit one of the modern sugar factories and also drive through one or two of the cacao districts. It would be convenient if particulars of the arrangements, proposed to be made in the several colonies, were communicated beforehand, so as to be ready to be handed to the delegates on their arrival at St. Kitt's. Such communications might be forwarded to the care of Messrs. S. L. Horsford & Co., and marked 'Canadian Delegation.'

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#### Exports of St. Vincent.

The production of arrowroot is still the principal industry in St. Vincent; the value of the exports of this product in the year 1905-6, according to the *Annual Colonial Report*, was £20,522. The value of the cotton exports has nearly doubled, being £8,280, as against £4,857 in 1904-5. The satisfactory position attained by this industry is referred to elsewhere, showing that a very decided advance has been made. The satisfactory prices have afforded encouragement to planters to extend their operations in connexion with this industry, on which St. Vincent's hopes for the future are at present centred.

There was during the year under review again a marked increase in the exports of cassava starch, fruit, vegetables, and ground nuts—all products shipped mainly by the peasantry. The export of cacao is slowly increasing. The increase in the value of the exports of live stock, from £3,993 (in 1904-5) to £5,076 (in 1905-6), is reported to be due to the brisk trade in small stock (pigs, goats, etc.) carried on with Trinidad by sailing vessels.

The sugar industry continues in an unsatisfactory condition, and a further decrease in the area planted may be looked for. Only 786,293 lb. of sugar, of an estimated value of £3,794, were shipped, as against 6,411,564 lb., valued at £25,592, in 1897, the year before the hurricane.

In concluding his report, the Administrator notes that the prospects of St. Vincent are appreciably brighter than they have been for many years past.



### Camphor in Formosa.

According to the *Tropenpflanzer*, for December 1906, the export of camphor from Formosa in 1905 was 3,858,514 lb. About 600,000 lb. more was furnished to the Japanese Government for military purposes. More than three-quarters of the former amount went to countries other than Japan, such as Germany, America, France, and England. The camphor production of Formosa has been retrograding for some years.

The trees which are cut down to obtain camphor must be forty to fifty years old, hence, although many trees have been planted, they do not increase the yield. The expectations as to obtaining the product from the leaves have, as yet, been only partially fulfilled. Camphor is manufactured in Japan from Formosa camphor-oil, and 667,524 lb. of camphor so obtained were exported from Japan. One firm has been given, till March 1907, a monopoly of the sale of Formosa camphor.

### Cacao in Jamaica.

The cacao trees in the Jamaica Public Gardens blown down or injured by the hurricane of 1903 have been mostly budded with Criollo buds, two strong shoots being encouraged near the ground, and one of them budded.

In some alluvial soils cacao trees begin to die off when about four or five years old. It appears that at that age their tap-roots enter a bed of sand or gravel. As an experiment, one of the older trees has had its tap-root removed and has not seemed to suffer in any way. In choosing a site for a cacao plantation, a hole 7 feet or 8 feet deep should be dug, to see that the loam is continued down to that depth without layers of sand.

There was scarcely any canker of cacao in Jamaica during 1905-6. In 1905-6, 32,587 cwt. of cacao was exported from Jamaica, an increase of more than 10,000 cwt. over the previous year's output.

### Minor Industries in British Guiana.

The annual report of the British Guiana Board of Agriculture for 1905-6 contains a return showing the number of acres under cultivation with the more important subsidiary agricultural products in the colony. The principal of these is rice. The area under cultivation in this cereal has again increased, and there are abundant signs that still further increases may be expected in the immediate future. The position of this industry, up to March 31, 1905, was reviewed in the *Agricultural News*, Vol. V, p. 193. The area in rice in 1905-6 was 23,853 acres, as compared with 21,920 acres in the previous year. The yield of rice increased from 15,600 tons in 1904-5 to 17,443 in the year under review.

During the last three or four years interest in cocoa-nut planting has revived, and considerable areas have been planted in the palms. The returns indicate an extension also in cacao planting, but the cultivation of coffee does not appear to be on the increase. Greater interest has been taken in fruit growing.

### Tobacco in Jamaica.

In the Annual Report of the Department of Public Gardens and Plantations in Jamaica, it is stated that the exports of Jamaica cigars during the year 1905-6 amounted to 39,010 lb., which is an increase of 5,866 lb., as compared with the previous year. The exports of Jamaica cigarettes were 10,870 lb., only a little more than half of those of 1904-5. Of leaf tobacco the exports increased from 6,478 lb. to 7,368 lb.

Samples of Sumatra wrappers grown at the Experiment Station were favourably reported on by Professor W. R. Dunstan, Director of the Imperial Institute, who advised that this tobacco should be put up in the same way as East India tobacco, in which case it would probably fetch a higher price. Mr. F. V. Chalmers considered the sun-grown Sumatra superior to that grown under shade-cloth.

Experiments in planting Havana tobacco at different distances, resulted in favour of the usual distances of 2½ feet by 15 inches. At closer distances the plants did not develop well, and a cultivator could not be used. At wider distances the tobacco appeared to become coarse. Experiments with Havana tobacco under shade were unsatisfactory, for the leaves were attacked by a fungus which formed small, round, whitish spots, and these became holes when the leaves were dried. Sumatra tobacco planted in the shade of bananas grew tall and weedy with smaller leaves than that under shade-cloth.

### Trinidad Fruit Trade.

By a clause in the contract granting a subsidy to the British West Indian Fruit Company for the development of the fruit trade of Trinidad, the company is required 'at all times during the continuance of this contract to provide and employ in Trinidad, at its own expense, a skilled, experienced, and suitable agent, who, at all times during the said term, shall use his best endeavours to improve by all practical means the system of cultivation of fruit in Trinidad, and shall instruct fruit growers in Trinidad with respect to such cultivation and also with respect to the best and most approved method of harvesting and packing fruit.'

In accordance with this clause, the Manager of the company has furnished a report, together with a statement showing the amount of fruit purchased by the company in Trinidad and shipped to England during the six months ended July 31, 1906. This information is published as Council Paper No. 131 of 1906. It shows that the following amounts of fruit were purchased: 7,318 stems of bananas, 67,875 oranges, 5,860 mandarins, 2,855 grape fruits, 5,509 mangos, 405 pine-apples, 5,900 cocoa-nuts, and 57,675 limes. The expenditure on the purchase of this fruit was \$2,365.96; that on labour, packing, coopering, supervision, and railage, \$1,453.76.

The Manager has advised as to the best methods of cultivation, harvesting, packing, etc. He adds: 'I am repeatedly being asked from London to ship more bananas and have been trying to buy every available stem of good fruit grown in the island.'





## DESTRUCTION OF SNAILS AND SLUGS.

The following, taken from Circular 53 of the *Comision de Parasitologia Agricola*, Mexico, 1906, indicates some of the methods that have been found useful in dealing with snails and slugs which are at times a serious pest in that country:—

The collection of snails by hand has been tried and found successful. The best times for the practice of this method are at the beginning and the end of the rainy season.

Pieces of board smeared with fat on the underside are laid down in infested places, with room beneath for the snails to collect. Cabbage leaves with rancid butter on one side, melon rinds, and the leaves of the common acacia are useful in attracting the snails.

For trapping slugs a very useful trap may be made of earthen flower pots provided with a cover and having a row of holes round the middle. These pots are sunk into the ground so that the holes come about at the surface. The inside of the pot is smeared with beer, a small amount of which is put into a dish at the bottom.

Another useful trap is made of a cone of galvanized iron, with many perforations, which is sunk into the ground leaving only the top row of holes above the surface. Pieces of potato, carrot, and apple have been found to be attractive baits in this trap.

When snails and slugs have been trapped, they may be killed by being left for five hours in a 5-per cent. solution of copper sulphate in water, or a 2-per cent. solution of lime in water.

These pests may be kept away from a nursery or garden plot by means of a rope of twisted grass or fibre soaked in a 10-per cent. solution of copper sulphate and stretched around the border. Bands of cloth soaked in this solution and fastened around the trunks of trees may be used to prevent the ascent of slugs and snails, while a solution of iron sulphate, 25 per cent. to 50 per cent., applied in a ring 4 inches wide around the trunk of the tree, is said to stop the passage of these small animals. They may be killed in weeds, hedges, etc., by spraying with a 1-per cent. to 4-per cent. solution of copper sulphate or a 1-per cent. solution of common salt.

Snails and slugs are eaten by geese, and the species of one genus of carnivorous snails (*Glandina*) are known to attack those that feed on plants.

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## TARANTULAS.

The name tarantula is usually applied to spiders of different families, and to the tailless whip-scorpion which belongs to another order.

At the present time the name is most commonly used to designate the large, dark-coloured, hairy spiders of the family *Theraphosidae*, which, instead of spinning true webs, frequently construct long tubes in the ground for nests. These are lined with silk, and certain species of the family provide a hinged lid for the opening of the nest, from which habit they are called trap-door spiders. The members of this family are provided with mandibles which move vertically and not

horizontally like the mandibles of other spiders and of insects. The family contains some of the largest of all the spiders, although some of them are not very large. The *Theraphosidae* are found only in warm countries.

The running spiders (family *Lycosidae*) somewhat resemble in appearance and habit the tarantulas. They are, as a rule, much smaller; but, like the tarantulas, they often construct nests in the ground in the form of tubes lined with silk. The legs are long and stout, well fitted for running. The female may be seen running about with a large grey egg-sac attached to the body. The running spiders are found farther north than are the tarantulas, although certain species are tropical.

The Italian hunting spider, which is said to have been the first to receive the name tarantula, belongs to the family of running spiders.

The tailless whip-scorpion, which is not rare in the West Indies, is called a tarantula, and it is also sometimes called a scorpion.

These small animals have broad flattened bodies with long, slender legs. The front pair of legs are very long and slender, resembling a whip-lash, and from this resemblance the name whip-scorpion has been derived. The whip-like front legs resemble antennae, and the casual observer will generally consider them as such. The whip-scorpions have large, toothed mandibles, and on this account they are supposed to be harmful, but although specimens are occasionally forwarded to the office of the Imperial Department of Agriculture, no record has been received of their biting anybody. The tarantulas inflict a painful bite, which is sometimes serious. Certain of the running spiders are believed to be poisonous, while the whip-scorpions are probably harmless.

In the Leeward Islands, a large, light-coloured spider is sometimes called a tarantula. This animal forms its nests by rolling leaves into the form of a tube which it lines with silk. Direct experiment has shown that in one case at least the bite of this spider produced no ill effect.

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## SWINE PLAGUE IN TRINIDAD.

In the Trinidad Council Paper No. 157 of 1906, an account is given of an outbreak of swine plague in that colony and the measures adopted for its suppression.

The outbreak occurred on Mr. E. C. Gerold's pig farm, at Maraval, which has been established for about two years. The pigs on this farm had done well until October 24 last, when one, an imported sow, died. This was one of six Tamworth pigs imported for breeding purposes, which were landed in Trinidad on October 23, and inspected by the Government Veterinary Surgeon. On November 11, another of these pigs died, and from that time till the 19th. several died every day.

In order to suppress the outbreak of swine plague, all the pigs, to the number of 400, were slaughtered and burnt, also the building, pens, etc., and the entire premises were disinfected with lime. The pig farm was declared by an Order by the Governor-in-Council to be an area infected by swine plague, and the movement of any swine in or out of the infected area was prohibited. The keeping of swine on the same premises was prohibited for six months.

It is hoped by these means, and from the fact that Mr. Gerold's farm is remote from other premises, thoroughly to eradicate the disease. To prevent the introduction of another epidemic, all swine imported from America must be placed in quarantine for three weeks in some location approved by the Government Veterinary Surgeon.



## CULTIVATION OF CASTILLOA RUBBER.

The following information is abstracted from an article by Theodor F. Koschny, San Carlos, Costa Rica, which appeared in the *Tropenpflanzer*, for December 1905. The references to the best variety for cultivation are of particular interest:—

A short time ago only one species of the genus *Castilloa*, viz., *Castilloa elastica*, was presumed to yield marketable rubber. In July 1901, the writer distinguished a variety of this species under the suffix *alba*. The rubber from *Castilloa elastica*, var. *alba*, fetches from 10d. to 1s. more per lb. in Hamburg than that of *Castilloa elastica*, var. *mexicana*. O. F. Cook has discovered several species of *Castilloa* on the Pacific side of Central America, all of which yield marketable rubber. H. Pittier has found another species, *Castilloa nicogana*, near the Gulf of Nicoga. *Castilloa costaricana*, which grows at high elevations south of 10° N., differs only in the leaves from *C. alba*; but it yields a very little rubber of a low quality. Unfortunately, it appears that all the plants sent first to south-east Asia and New Guinea were of this nearly valueless species. It is the one planted first in Java.

*C. elastica*, var. *mexicana*, was the species collected by Dr. Preuss for the German colonies. It produces a good quantity of rubber and its cultivation is remunerative, but the quality of the rubber is inferior to that of *C. alba*. The latter can replace the best Hevea rubber; the tree is more cheaply tapped than Hevea; the preparation of the latex is simpler, and the returns are greater. Dr. C. O. Weber says in regard to his trials of this species: 'The rubber thus obtained is a product of a degree of purity, in which no rubber, not even the finest brands of Para, has ever been offered to the manufacturer.' The scrap rubber, when clean, is valued at the same price as the best Sernamby of Para.

*Castilloa* requires a certain amount of shade. It will not grow at all, of course, under the full shade of a forest. With too much shade it forms thin, tall, easily-broken stems which increase but slowly in thickness. But it is not a tree for the open. It grows very well in the open as long as the sap is watery; but when it is older and taller the sun strikes on the unshaded trunk and warms the thick latex in the bark. This causes the death of many trees even without tapping. Experience has shown, again and again, that no unshaded plantation of *Castilloas* will stand heavy tapping for many years.

Up to the sixth year the plantation needs no shade. Two years later, if the plantation is not kept cleared, wild trees and bush will have grown high enough to shade the stems, in a moist climate. If this plan is not adopted, or if it is prevented in places by long dry seasons, then shade trees should be previously planted. I have practised leaving forest trees standing singly when clearing the ground for a plantation. If two-fifths or three-fifths of the original forest trees are cleared away at first, the *Castilloas* grow well. After six years, no more cutting away of bush need be done.

From 1879-82 I planted *Castilloa alba* in open land and also between cacao, 8½ acres of each. Those in the open died without tapping or at the third tapping. Those in the forest or at the edge of the forest are alive to-day, and have been tapped every year. *Castilloa* requires perfectly permeable subsoil. Where the soil or subsoil is not of this character, no *Castilloas* should be planted. *Castilloa* would not be attacked by the beetle borer if the tree was in health, and if such is the case, it is to be presumed that the subsoil is impermeable and the tree unhealthy. Seedlings can be transplanted when very small with earth about their roots,

or they can be transplanted at a year old if the tap-root is cut back to the woody part, all side roots cut off, and also the stem cut back to wood. Such a bare stick must be planted with the crown (from which the first new roots grow) ½ inch to ¾ inch under the soil. If the crown is above the soil there is no growth.

The often-advised close planting of *Castilloas* and subsequent thinning is not usually to be recommended. Where land is cheap or where the wind may be strong, it should not be done. Close planting produces trees with long, weak trunks. After thinning, they are easily blown down. It is to be noticed that in tapping, the strong bast fibres, which help greatly to support the stem, are cut, and a tall tree is then easily broken down by wind.

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## TAPPING CASTILLOA TREES.

Mr. J. Herbert Foster, of Tula de los Tuxtlas, gives in the *Mexican Investor*, for January 5, 1907, his results in tapping *Castilloa* trees.

Mr. Foster shipped about 1,200 lb. of rubber from the Tula plantation in 1906. The trees averaged 20 to 25 inches around, just above the root enlargement, the largest ones ranging from 30 to 38 inches. He uses a Smith tapping knife and makes three V cuts about 20 inches apart, each reaching not quite round the tree, but leaving 5 inches uncut. A small cup is fixed at the apex of each, and the latex spooned down into it. The cups are emptied into a pail. There is no need of water to prevent coagulation. The cups are not left on the trees. After tapping twelve trees, and again after two or three hours, the workman returns and spoons out the cuts. At Tula the men tap all day, while at Soconusco the heat checks the flow in the afternoon.

Each man has two 30-gallon barrels. The latex is washed through a fine sieve together with the washings of the cups, and the result of one day's work usually fills one barrel. The next morning the water is drawn off, as the creamy latex is on the top. The barrel is then half filled with fresh water, which is changed the same day. On the next morning all the water is drawn off, and the cream poured out into frames to dry in the sun. The frames are made of 1-inch by 2-inch strips, 5 feet long and 10 inches broad, and divided by cross pieces into 8-inch squares. The bottom is made of cotton cloth. In ordinary weather, three to six days are required for drying. In 1905, the average price for Tula rubber and scrap was \$1 gold per lb.

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## TRANSPLANTING TREES.

In the *Queensland Agricultural Journal*, for November 1906, the following directions are given for transplanting trees:—

Dig a trench round and under the tree so as to leave a good ball of earth on the roots.

Place planks underneath and remove the tree.

The hole prepared for the reception of the tree should be partly filled with good soil.

The tree should be planted at exactly the same depth as it was growing.

The tree should receive a judicious head-pruning, and the injured portions of the roots should be cut off clean.

If the weather is dry, the hole should be well soaked prior to the planting.

After the soil has been filled in and made firm, a mulch should be applied.





## GLEANINGS.

In 1905-6, 83,920 cwt. of coffee were exported from Jamaica, an increase of more than 30,000 cwt. over the previous year.

The world's consumption of nitrate of soda for 1906 amounted to the prodigious total of 1,641,000 tons, against 1,547,000 tons in 1905, an increase of 94,000 tons, or 6 per cent. (*Farm Life*.)

The Agricultural Instructor for Nevis reports: 'The onion seed has germinated well this year, and a larger acreage will be under this article this year than last, but the area is still a very small one.'

Up to February 4, 105,622 lb. of lint had been ginned at the St. Vincent Cotton Factory, which, with the supplies of seed-cotton to hand, will equal 340 bales of 360 lb. each. Heavy supplies are being received daily.

The increase in the value of the banana exports from Costa Rica in 1905 was \$600,000. About 1,200,000 more bunches were exported than in 1904. Of the total shipments the United States took 5,045,321 bunches, and England 2,237,779 bunches. (*U.S. Monthly Consular Reports*.)

In reply to a correspondent, the *West India Committee Circular* states: 'The small yellow Barbados banana is the *Musa Cavendishii*.' The description 'small yellow' would almost suggest that the writer has in mind the 'lady's finger' or 'small fig' rather than the ordinary Barbados banana.

In connexion with the offer of prizes to allottees on the Land Settlement Estates in St. Vincent for the encouragement of good cultivation, the following awards have been made 'for the best-worked and best-kept allotment on any Land Settlement Estate in the island': (1) Eli King (No. 56, New Adelphi), £3; (2) J. Ben (No. 38, Park Hill), £2; (3) Amos Mackin (No. 22, Spring, Cumberland Valley), £1.

A correspondent writes: 'The cotton seed oil factory at Nevis is now in course of erection. The building, which is just opposite the landing place, presents quite an imposing appearance, and it has been put up with commendable expedition.' It is rumoured that a cotton seed oil factory is also proposed to be erected shortly at St. Kitt's.

According to the *Annual Colonial Report* on Fiji for 1905, experience has proved that, owing to the large number of indentured immigrants who settle permanently in the colony, the funds provided for repatriation largely exceed all ordinary demands on them. The 'Return Passage Fund' has therefore been abolished, and the cost of repatriation will in future be provided by a vote on the annual estimates.

It is stated in the *Annual Colonial Report* on Southern Nigeria that the exports of cacao show a small increase in quantity, but a comparatively large increase in value. 'The inferior quality of the cacao has been noticed, but the returns intimate that some improvement has taken place. More care has been given to the preparation of this article for sale and to the method of cultivation.'

The quantity of molascuit exported from British Guiana during the year 1905-6 was greater by 2,438 tons than the quantity shipped in 1904-5. The value was higher by \$24,735. The output of this new by-product of the sugarcane, since its first appearance on the export list in 1902-3, has doubled itself nearly fifteen times, while the value has trebled itself a little more than nine times. The quantity exported in 1905-6 was 11,405 tons, of the value of \$200,947.

Jamaica oranges have a free run in the United States markets from August till November. The high duty, 1c. per lb., has virtually killed the market for Jamaicas, except during the three months mentioned. The only hope for Jamaica is so to work the orange trees that the fruit will come in early. Then, in spite of the high duty, oranges will pay. Almost the same applies to the British market, only instead of Florida oranges it is Spanish oranges that compete with us. (*Journal of the Jamaica Agricultural Society*.)

A Government Tea Farm has recently been established at Pierce, Texas. Twenty-five acres of tea have been planted there and the preliminary picking indicates that a high grade of black tea will probably be produced. Last year over 9,000 lb. of tea were made at the Government Tea Farm at Summerville, South Carolina. Negro children, under instruction, soon become very adept tea pickers. (*Oklahoma Farmer*.)

The Director of Public Gardens and Plantations in Jamaica has announced that he has obtained, through His Majesty's Consul at Guayaquil, several plants of the valuable Ariba cacao, which is quoted on the London market at 80s. per cwt., while Jamaica was at 62s. to 68s. This variety is probably nearly related to that with a white bean known as Criollo. It remains to be proved by experiment whether Ariba cacao can be grown anywhere in Jamaica so as to preserve its character and maintain its health.

At the Ceylon Rubber Exhibition a new method of distilling oil-grasses was shown in work. The freshly-cut grass was put into a receiver. Steam was passed through the receiver, carrying off the vapour of oil. This passed into a coil of piping in a tank of cold water, by which the steam was condensed. The water was returned to the boiler, and the condensed oil ran out into a receiver. The still seemed to work well, and was the first one built without a long water trough.

The *Journal of the New York Botanical Garden*, for December 1906, gives an account of a rare book on the natural history of the Leeward Islands, entitled 'Voyages to the Madeira and Leeward Caribbean Isles, with sketches of the Natural History of these Islands.' Its date is 1792, and it is a narrative of a journey to the West Indies made in 1788 by the daughter of the Governor of St. Kitt's and the Leeward Islands. It contains accounts of visits to Madeira, St. Christopher, Antigua, and Barbuda, together with a chapter on the 'Geographical and Natural History of Antigua.'





**JAMAICA: REPORTS OF THE BOARD OF AGRICULTURE, PUBLIC GARDENS AND PLANTATIONS, AND ISLAND CHEMIST FOR 1905-6.**

*Board of Agriculture.*—It is noted that the work of the Botanical Department is under the control of the Board, while the part of the work of the Laboratory which is unconnected with agriculture, is entirely independent of the Board. On the suggestion of the Board an advisory committee was appointed early in the year to co-operate with the Island Chemist in the management of the Sugar Experiments. Assistance from the Imperial Grant-in-aid of Agriculture in the West Indies has ceased as from the close of the year under review. Provision has, however, been made on the estimates of the colony for the salary of the Lecturer in Agricultural Science hitherto defrayed from that source.

*Public Gardens and Plantations.*—This section of the report deals with (i) agricultural experiment work, (ii) agricultural educational work, and (iii) the garden work at Hope Gardens, Castleton Gardens, Hill Gardens, Kingston Public Garden, and Kings House Garden.

The number of plants distributed by the Department was 255,343, of which 241,210 were economic and 14,133 ornamental. Included in the above are 113,089 cane tops and cuttings. Of the 69,400 economic plants sold, 28,596 were cacao, 22,400 tobacco, 10,001 rubber, and 3,569 were citrus plants.

Much useful experimental work was done at the Hope Station with tobacco, cassava, sugar-cane, cotton, rubber, cacao, and other economic plants. These experiments will be referred to later.

The instruction of various classes of students is carried on at Hope by the Assistant Superintendent. These include: Industrial School boys, Apprentices, Laboratory students, Training College students, and Elementary School teachers.

*Island Chemist.*—This report has already been reviewed in the *Agricultural News* (Vol. V, p. 413).

**BRITISH GUIANA: REPORT ON THE BOTANIC GARDENS FOR 1905-6.** By A. W. Bartlett, B.A., B.Sc., F.L.S., Government Botanist.

During the year 27,130 plants were raised in the nursery and planted in the Botanic Gardens. There is a fairly steady demand for cacao and coffee plants, and more orders are received for grafted mangos than the nursery is able to supply. As there have been inquiries for plants of *Hevea brasiliensis* and other rubber plants, an endeavour has been made to obtain a large quantity of *Hevea* seed from Ceylon.

The propagation of oranges by budding has not been successful at the nursery. The coast district does not appear to be well suited to the growth of these fruits.

'The most important work of the year has been the excavation of a trench to carry the water for watering and irrigation from the large trench at the bottom of the experimental fields to the flower garden and nursery, a total distance of over a mile.'

This report also deals with the work at the Government House grounds, the Public Buildings gardens, the Old Military burial grounds, and the Public Gardens in Berbice.

The total rainfall registered at the Botanic Gardens for the year 1905 was 77.70 inches, which was 14.51 inches below the average for the last twenty-six years.

**BRITISH GUIANA: REPORT OF THE BOARD OF AGRICULTURE FOR 1905-6.** By J. B. Harrison, C.M.G., M.A., etc., Chairman.

This report contains a précis of the proceedings of the three general meetings held by the Board and of the different matters dealt with by the following standing committees: Live Stock, Library, Exhibition, Sugar-cane Experiments, and Subsidiary Products.

Special reports dealing with many of these matters have been published from time to time and have formed the subjects of several notes in the *Agricultural News*.

Particular interest attaches to the information collected by the Subsidiary Products Committee as to the extension of the rice industry. This is referred to elsewhere in these columns. The same committee has interested itself in encouraging the planting of cocoa-nuts, cacao, coffee, cotton, ground provisions, etc.; also in fruit growing.

At the end of the year the Board was in possession of the following imported animals: two Shorthorn bulls, two half-bred Guernsey bulls, three Holstein cows, two Holstein-Shorthorn calves, one Zebu bull, three Zebu cows, two Berkshire boars, two sows, and one Shropshire ram. The Board has also a large number of imported fowls.

**AGRICULTURAL SHOW IN THE VIRGIN ISLANDS.**

Mr. W. C. Fishlock, Agricultural Instructor, has forwarded the following report on the Agricultural Show held at Tortola, Virgin Islands, on October 24 last:—

The exhibits showed a considerable falling off in point of numbers this year as compared with last year, the numbers being, respectively, 356 and 800. On the other hand, the quality was good, and in many cases showed an improvement on last year. This was especially the case in the cotton class, where some really excellent samples of cotton were shown. Fruit and vegetables were very poorly represented, the high winds at the commencement of September accounting for the scarcity of the former; there was also a rather unfavourable general scarcity of ground provisions about August, September, and October.

There were creditable samples of fresh butter, cocoa-nut oil, rum, etc., and some good exhibits in the industrial section. The stock were not very good, in many cases no care had been taken even to clean the animals before bringing them to the show.

It was proposed to make a charge for admission to the show, but the idea had to be abandoned.

The Acting Commissioner's wife, Mrs. Wynne, kindly opened the show and afterwards distributed the prizes. Several ladies and gentlemen from St. Thomas and St. John assisted in judging the exhibits. The Rev. C. R. Trace worked very hard in helping to make the show a success, both in holding meetings in the country districts and in helping to arrange the exhibits.

On the whole, I regret I cannot regard the show of 1906 as having been quite as successful as it might have been.



## WEST INDIAN AGRICULTURAL CONFERENCE, 1907.

On Sunday, January 13, there was a special service at the Kingston Parish Church in connexion with the West Indian Agricultural Conference, when the Archbishop of the West Indies was the preacher. He took his text from 1st. John, c. 1, v. 5. 'God is light' and Genesis, 1, v. 3. 'And God said, let there be light.' In passing to the practical applications of his subject, his Grace said:—

The existence and the operations of the Imperial Department of Agriculture, with its various integral and allied sections, is a cogent example of the fact that, in an age which seems almost entirely devoted to material interests, they who will look deeply enough into things will find abundant evidences of the all-prevailing influence of mind over matter. The plan and purpose of the organization were conceived in the mind of one or two men. They were put into visible and tangible shapes; and within a short period the mental and physical energies of numerous collaborators and assistants were at work in every British West Indian Colony, inventing, discovering, experimenting, and making the knowledge gained available to increase the products and the prosperity of these countries, and rescue our communities from that poverty, stagnation, and decay which threatened them.

Light, knowledge, ideas, plans, purposes, mental determinations, these are the forces which control human affairs so far as that control is exercised by man. Mind rules matter: thought governs action: light is life.

On behalf of those Christian people in Jamaica who are specially interested in the progress of scientific agriculture, I welcome to this Church and to this service the men whose scientific knowledge and experiments and practical experience are quietly but effectively doing much to promote the interests of the present and the future generations of West Indian people. It is a fitting arrangement that the West Indian Agricultural Conference, now assembled in this city, should, in accordance with the custom of such assemblies in the Mother Country, meet on this holy day in this place devoted to the teaching of religion and the worship of God. It is the direct purpose of the Christian religion to promote all human interests. The life of Jesus Christ and his teaching have inspired his truly instructed followers to aim at this. In what he taught and did are to be found the seeds of all progress in the service of humanity. Those who are specially set apart to do the work of the Church of Christ need to recognize that they are not the only workers who are carrying out the great aims of our Master: that life is more complex now than of old: that teachers and workers have to specialize, and bring learning and experience of special kinds to bear on the whole problem of humanity; and that while the plans and methods are diverse, there is a real unity in the work of those who are seeking truly to benefit the human race or any section of it.

As I have intimated, the Agricultural Department of the West Indies and the official and unofficial members of the Conference have done and are doing much for the ultimate welfare of these islands. The brain worker and the capitalist need the encouragement and the recompense which success in any department brings with it; and there is much that science and practical experience can do to help towards both extending the operations and securing the profitable results of agriculture. And the labourer also needs to share fully in these beneficial developments. He needs lifting up to a higher level of intelligence, and industrial power and adaptability to modern methods and requirements. In many instances he

needs to have much better surroundings, more real comforts, more financial reward for his labour. He cannot fail to get these things if the progress we are all seeking be wisely guided, and if the benefit of the whole community be sought. Scientists, capitalists, experienced planters, intelligent labourers are all needed for a true industrial progress in countries like these. And no true and permanent gain can be secured for one interest without the other interests benefiting.

Some new conditions under which agriculture is being developed in the West Indies may be expected to furnish special advantages for promoting the social, material, and moral welfare of the labouring population. This is a feature of the central factory system on the growth and manufacture of sugar and other products, which ought to be particularly interesting to those who are concerned in improving the condition of the general population. In those parts of the West Indies where land for the use of the small proprietor or settler is available in proximity to a central factory, he can, under that system, have his own homestead, where he and his family may live in comfort and in conditions which industry and frugality annually improve: on such a homestead he can cultivate for the central factory, he can supplement the income thus secured by the growth of various additional products: portions of the family can work on the large estate near by receiving fair value for their labour.

And while the development (hardly begun in Jamaica) of the co-operative form of cultivation of the larger staples contains great possibilities of improved material and social conditions in those regions specially suited for it, the producer on a small scale of these and other products, in other places, will, I hope, share, in an increasing degree, in the advantages obtainable from good scientific and practical instruction and from cheap facilities for the transport of his various products to good markets. We in Jamaica, partly through the Direct Line of steamers, and partly through other enterprises, have begun to realize the advantage of such facilities of transport which I hope will be secured to us in even greater degree, and also be extended to other colonies. Scientific agriculture will do much for us; but continuity of development in production and reliable access and means of transport to good markets are also essential to success.

Speaking generally, the intelligent planter already is, and will increasingly become interested in the real welfare of the labourers. Light has been obtained on many parts of the labour problem; and we need more. In connexion with the agricultural advancement, the question of improving the health conditions of the labouring population needs to be studied and practically taken in hand. I hope it will have attention in this Conference. In most West Indian communities the waste of life in early youth is very great. We need not only to save more of the young life, but also to aim at securing its growth into healthy and strong manhood and womanhood; and this must be sought by improvement in the methods and conditions of life in its early stages, and also in those stages which follow all through active mature life.

I must abruptly hasten to a conclusion. The subject we have been considering has manifold ramifications. I have only presented ideas and suggestions in the most fragmentary way. I close with a few words relating to matters on which I feel not the less strongly because my words must be few.

The whole aim of our agriculture, as it affects the higher as well as the lower classes of the community, should be progress; but not mere money making. Men can wisely strive to secure enough for comfort and for competence.



## WEST INDIAN PRODUCTS.

### Drugs and Spices in the London Market.

Mr. J. R. Jackson, A.L.S., has forwarded the following report on the London Drug and spice market for December:—

In reporting on the market for the last month in the year, there is, as usual, but little to say with regard to the extent of business either with individual articles or generally.

#### CAMPHOR.

Though not a product immediately affecting the West Indies, it may not be without interest to refer here to the position of camphor at the present time in the English and Continental markets. Notwithstanding that it has been definitely stated that artificial camphor is now manufactured commercially on a large scale in Germany, and further that a German chemical firm has contracted to supply artificial camphor by the ton to a firm of celluloid manufacturers, the Japanese Consul at New York has recently issued the following statement: 'The consumption of camphor throughout the world is steadily increasing and this has served to aggravate the present situation. The refiners in this country cannot procure sufficient camphor from Japan to meet their requirements. Most of these refiners have a suspicion that Japan is taking advantage of its monopoly of camphor, but this is not true. Our Government is endeavouring to increase the supply of the crude material to meet the demand of the market. The Governor-General of Formosa recently issued a notification to the effect that it was necessary to increase the yield on the island, so as to encourage the planting of camphor trees, and at the same time called attention to the fact that proper caution must be taken for the preservation of the present trees, which are limited in number.'

These words of advice are worth careful consideration, when we know that during the month of December a camphor famine was talked about and £20 per cwt. mentioned as a future figure for natural camphor, £18 17s. being actually paid in the first week of December. It may be further stated that in the present complex condition of camphor, we have to consider the truth or otherwise of the statement that in America free supplies of artificial camphor are obtainable, which, though not suitable for medicinal purposes or for the manufacture of white celluloid articles, is perfectly applicable to dark celluloid goods.

Whether all the statements regarding the artificial product are supported by facts only time can prove, but the high figure asked and obtained for the natural product at the present time would indicate either a preference for natural camphor or a disbelief in the quantities of the artificial product obtainable.

To return to spices and drugs of West Indian production, the notes for the month indicate nothing beyond a very normal market.

#### GINGER.

At the first spice auction, on December 5, 35 barrels of Jamaica were offered and bought in at 66s. for good ordinary; 870 packages of Cochin and Calicut were also offered, and 170 sold without reserve at 28s. for washed rough, slightly wormy. A week later, 47 barrels of Jamaica were offered, and a few were disposed of at the previous rate for small washed. On the 19th., there was a slight advance in the prices asked for Jamaica, but no sales were effected. No business was done in ginger beyond that date.

#### NUTMEGS, MACE, AND PIMENTO.

At the first sale, there was a steady demand for West Indian nutmegs, which ruled at 1s. 2d. lower than previous quotations. On the 19th., 24 packages of West Indian were offered and sold at the following prices: 63's at 1s. 2d.; 73's at 7½d.; 94's to 96's at 7d.; 130's at 4¾d. per lb.; 20 cases of Penang were also offered and bought in at 8½d. to 9d. per lb. for 100's. After this date there were no sales.

Mace was in steady demand at the beginning of the month, and 9 packages were sold at 1s. 5d. for fair palish West Indian, 1s. 3d. to 1s. 4d. for fair red, and 1s. 1d. for broken. For pimento there was no demand throughout the month. On the 5th., fair quality was bought in at 2½d. per lb., and on the 19th., 220 bags were offered and bought in at 2¾d. per lb.

#### ARROWROOT.

On the 5th., 270 barrels of St. Vincent were bought in at 2½d. to 3½d., according to quality.

#### SARSA PARILLA.

This article continues to maintain a firm position. At the drug sale on the 6th., 10 bales of fair grey Jamaica were disposed of at from 2s. 3d. to 2s. 4d. per lb.; 6 bales of Lima-Jamaica, fair to part coarse and lumpy, were also sold at 1s. 8d. per lb.; 1s. per lb. was paid for 1 bale of fair mixed native Jamaica, and 9d. for sea-damaged. Guatemala was bought in at 1s. 3d. Though no further sales were made during the rest of the month, some arrivals of grey Jamaica and red native were reported.

#### KOLA, TAMARINDS, AND ORANGE PEEL.

Kola nuts were reported in the early part of the month as in large supply; 25 barrels of fair Jamaica were disposed of at 2½d. per lb.; and for another lot of 28 bags 3d. per lb. was paid for good, 2½d. for fair, and 2d. for mouldy.

Of 16 barrels of West Indian tamarinds offered at the beginning of the month, 6 were disposed of at 16s. per cwt. in bond. Of orange peel, thin Malta strip of fair quality was sold without reserve at 6d. per lb., dull at 2d., and a quantity of low burnt Malta machine-cut was disposed of without reserve at 1d. per lb.

### VARIETIES OF GROUND NUTS.

The following appears in the *U. S. Monthly Consular Reports*, for January:—

Replying to American inquiries in regard to the commercial practise in Marseilles, Consul-General Robert P. Skinner states that no special claims are made by buyers, nor is any guarantee given by importers or sellers as to the yield of oil from the various grades of ground nuts sold in that market.

From long experience it is known that Senegal ground nuts in the shell yield from 32 to 33 per cent. of oil, taken on the gross receipt, including the shell. These nuts comprise the Ruffisque, Cayor, and Sine qualities. Gambia nuts in the shell yield from 31½ to 32 per cent. of oil. The Senegal nuts yield the better qualities of oil, the value of the same being about 5 francs (96c.) per 100 kilos (220.4 lb.) more than that of the Gambia nuts. The oil of the Senegal nuts brings from 50 centimes (9.6c.) to 1 franc (19.3c.) per 100 kilos (220.4 lb.) more than Gambia nuts. Both grades of nuts yield from 21 to 22 per cent. of oil on the first pressing and from 10 to 11 per cent. on the second pressing. Oils of the first or cold pressing are naturally of the high grades, and the second or warm pressings supply secondary qualities.



## MARKET REPORTS.

London,—January 15, 1907. 'THE WEST INDIA COMMITTEE CIRCULAR,' Messrs. KEARTON, PIPER & Co.; Messrs. E. A. DE PASS & Co., December 29, 1906; 'THE LIVERPOOL COTTON ASSOCIATION WEEKLY CIRCULAR,' January 11; and 'THE PUBLIC LEDGER,' January 12, 1907.

ALOES—Barbados, 15/- to 60/-; Curaçoa, 18/- to 56/- per cwt.  
 ARROWROOT—St. Vincent,  $2\frac{1}{4}d.$  to  $2\frac{3}{4}d.$  per lb.  
 BALATA—Sheet, 1/6 to 2/-; block, 1/6 to 1/7 per lb.  
 BEES' WAX—£6 to £6 10s. per cwt.  
 CACAO—Trinidad, 88/- to 96/- per cwt.; Grenada, 79/- to 86/- per cwt.  
 CARDAMOMS—Mysore, 8d. to 3/4 per lb.  
 COFFEE—Jamaica, good to fine ordinary, 40/- to 44/-; greenish to fine, 50/- to 123/- per cwt.  
 COTTON—Good medium, 6·70d.; West Indian Sea Island, good medium, 18½d.; medium fine, 19½d.; fine, 21d.; price paid, 17½d. per lb.  
 FRUIT—  
 GRAPE FRUIT—7/- to 9/- per box.  
 BANANAS—Jamaica, 4/- to 6/- per bunch.  
 ORANGES—8/- to 10/- per box.  
 PINE-APPLES—St. Michael's, 1/6 to 3/6 each.  
 FUSTIC—£4 5s. to £4 15s. per ton.  
 GINGER—Jamaica, common, 56/- to 58/-; medium to fine, 60/- to 85/- per cwt.  
 HONEY—16/- to 28/- per cwt.  
 ISINGLASS—West Indian lump, 1/9 to 2/5; cake, 1/1 per lb.  
 KOLA NUTS— $2\frac{1}{2}d.$  to 6d. per lb.  
 LIME JUICE—Raw, 10d. to 1/1 per gallon; concentrated, £21 10s. per cask of 108 gallons; hand pressed, 2/9 to 3/- per lb. Distilled Oil, 2/- per lb.  
 LOGWOOD—£4 5s. to £4 15s.; roots, £3 5s. to £4 5s. per ton.  
 MACE—Pale reddish, 1/3 to 1/4; red, 1/3; broken, 1/- to 1/2 per lb.  
 NITRATE OF SODA—Agricultural, £12 10s. per ton.  
 NUTMEGS—71's, 10d.; 80's, 9d.; 87's, 8d.; smalls,  $4\frac{1}{2}d.$  to 6d. per lb.  
 PIMENTO—Fair,  $2\frac{1}{2}d.$  to  $2\frac{3}{4}d.$  per lb.  
 RUM—Jamaica, 2/5; Demerara, 1/2 to 1/3½ per proof gallon.  
 SUGAR—Yellow crystals, 16/6 to 18/- per cwt.; Muscovado, 14/- to 15/- per cwt.; Molasses, 11/6 to 12/- per cwt.  
 SULPHATE OF AMMONIA—£11 15s. per ton.

Montreal,—January 18, 1907.—Mr. J. RUSSELL MURRAY.  
 (In bond quotations, c. & f.)

COCOA-NUTS—Jamaica, \$27·00; Trinidad, \$25·00 per M.  
 COFFEE—Jamaica, medium, 10c. to 12c. per lb.  
 GINGER—Jamaica, unbleached, 13c. to 14c. per lb.  
 MOLASSES—Barbados, 27c. to 28c.; Antigua, 25c. to 26c. per Imperial gallon.  
 NUTMEGS—Grenada, 110's, 15c. to 16c. per lb.  
 PIMENTO—Jamaica,  $5\frac{1}{4}c.$  to  $5\frac{1}{2}c.$  per lb.  
 SUGAR—Grey crystals, 96°, \$1·98 to \$2·05 per 100 lb.  
 —Muscovados, 89°, \$1·40 to \$1·50 per 100 lb.  
 —Barbados grocery, \$2·10 to \$2·25 per 100 lb.

New York,—January 25, 1907.—Messrs. GILLESPIE Bros. & Co.

CACAO—Caracas, 18c. to 19c.; Grenada,  $17\frac{1}{2}c.$  to 18c.; Trinidad, 18c. to 19c.; Jamaica, 15c. to  $16\frac{1}{2}c.$  per lb.  
 COCOA-NUTS—Jamaica, \$23·00 to \$24·00; Trinidad, \$21·00 to \$22·00 per M.  
 COFFEE—Jamaica ordinary,  $7\frac{3}{4}c.$  to 8c.; good ordinary,  $8\frac{1}{2}c.$  per lb.  
 GINGER—Dark scraggy root,  $10\frac{1}{2}c.$  to  $11\frac{1}{4}c.$ ; small to bright bold,  $11\frac{1}{2}c.$  to 13c. per lb.  
 GOAT SKINS—Jamaica, Antigua, and Barbados, 59c. to 61c.; St. Kitt's, St. Thomas, and St. Croix, dry flint, 59c. to 61c. per lb.

GRAPE FRUIT—Jamaica, \$3·00 to \$4·00 per barrel; \$1·75 to \$2·50 per box.  
 HONEY—Jamaica, 72c. per gallon.  
 LIMES—\$7·50 per barrel.  
 MACE—35c. per lb.  
 NUTMEGS—95's to 100's, 16c.; 100's to 110's, 13c.; 130's, 12c.  
 ORANGES—Jamaica, \$3·50 to \$4·00 per barrel; \$1·50 to \$1·75 per box.  
 PIMENTO—5½c. to 5½c. per lb.  
 SUGAR—Centrifugals, 96°, 3·48c.; Muscovados, 89°, 2·98c.; Molasses, 89°, 2·73c. per lb. duty paid.

## INTER-COLONIAL MARKETS.

Barbados,—January 28, 1907.—Messrs. T. S. GARRAWAY & Co., and Messrs. JAMES A. LYNCH & Co.

ARROWROOT—St. Vincent, \$3·80 to \$4·75 per 100 lb.  
 CACAO—Dominica, \$12·00 to \$15·00 per 100 lb.  
 COCOA-NUTS—\$14·00 per M. for husked nuts.  
 COFFEE—\$10·25 to \$10·50 per 100 lb.  
 HAY—85c. to \$1·10 per 100 lb.  
 MANURES—Nitrate of soda, \$65·00; Ohlendorff's dissolved guano, \$55·00; Cotton manure, \$42·00; Cacao manure, \$42·00 to \$45·00; Sulphate of ammonia, \$75·00; Sulphate of potash, \$67·00 per ton.  
 ONIONS—Madeira, \$4·50 per 100 lb.  
 POTATOS, ENGLISH—Nova Scotia, \$2·20 to \$2·30 per 160 lb.  
 RICE—Ballam, \$5·45 to \$6·00 per bag (190 lb.); Patna, \$3·00 to \$3·75; Rangoon, \$2·70 to \$2·90 per 100 lb.  
 SUGAR—No quotations.

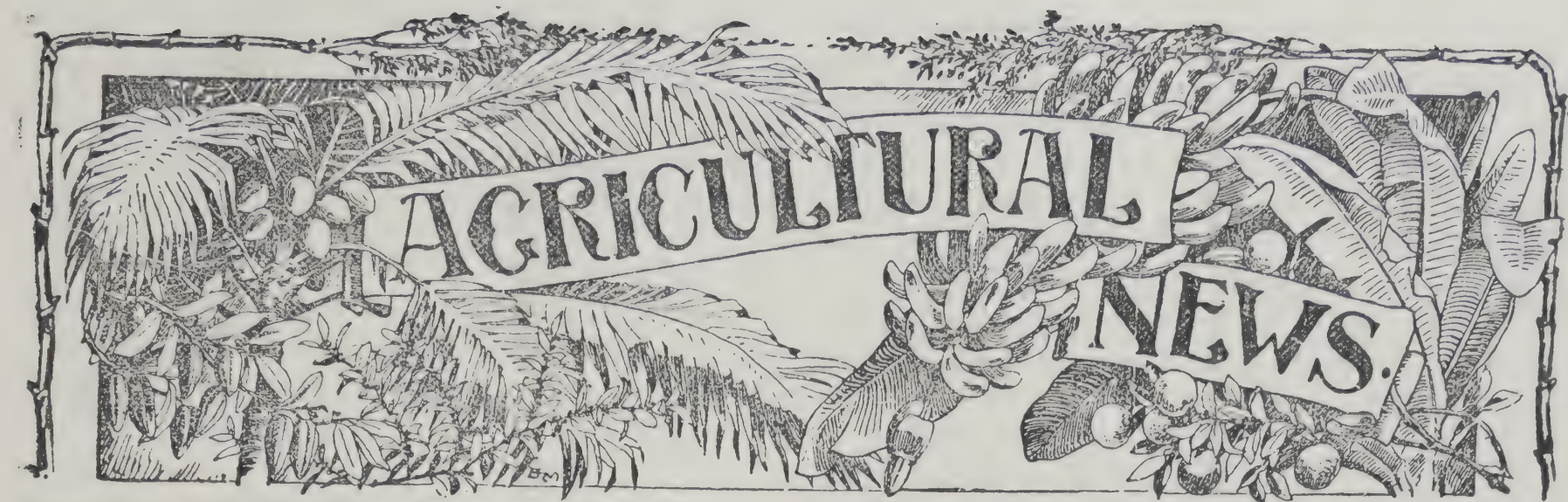
British Guiana,—February 2, 1907.—Messrs. WIETING & RICHTER.

ARROWROOT—St. Vincent, no quotations.  
 BALATA—Venezuela block, 25c.; Demerara-sheet, 38c. per lb.  
 CACAO—Native, 15c. to 16c. per lb.  
 CASSAVA—60c. per barrel.  
 CASSAVA STARCH—\$6·00 per barrel.  
 COCOA-NUTS—\$10·00 to \$12·00 per M.  
 COFFEE—Creole, 14c. to 15c. per lb.  
 DHAL—\$4·30 to \$4·35 per bag of 168 lb.  
 EDDOS—96c. to \$1·68 per barrel.  
 MOLASSES—16½c. per gallon.  
 ONIONS—Madeira, 4c. to 4½c. per lb.  
 PLANTAINS—20c. to 40c. per bunch.  
 POTATOS, ENGLISH—Nova Scotia, \$2·75 to \$3·00 per barrel.  
 POTATOS, SWEET—Barbados, \$1·20 to \$1·32 per bag.  
 RICE—Ballam, \$5·90 to \$6·10 per 177 lb.; Creole, \$4·75 to \$4·80 per bag (ex store).  
 SPLIT PEAS—\$5·90 to \$5·95 per bag (210 lb.).  
 TANNIAs—\$1·80 per barrel.  
 YAMS—White, \$1·92; Buck, \$2·16 per bag.  
 SUGAR—Dark crystals, \$2·00 to \$2·10; Yellow, \$2·50 to \$2·60; White, \$3·50 to \$3·60; Molasses, \$1·40 to \$1·75 per 100 lb. (retail).  
 TIMBER—Greenheart, 32c. to 55c. per cubic foot.  
 WALLABA SHINGLES—\$3·00, \$3·75, and \$5·25 per M.

Trinidad,—January 12, 1907.—Messrs. GORDON, GRANT & Co.

CACAO—Ordinary to good red, \$18·25 to \$18·50; estates, \$19·00 per fanega (110 lb.); Venezuelan, \$18·50 to \$19·00.  
 COCOA-NUTS—\$21·00 per M., f.o.b.  
 COCOA-NUT OIL—75c. per Imperial gallon (cask included).  
 COPRA—\$4·25 to \$4·50 per 100 lb.  
 DHAL—\$4·35 to \$4·40 per 2-bushel bag.  
 ONIONS—\$3·00 to \$4·00 per 100 lb. (retail).  
 POTATOS, ENGLISH—80c. to \$1·25 per 100 lb.  
 RICE—Yellow, \$5·40 to \$5·75; White, \$5·60 to \$5·75 per bag.  
 SPLIT PEAS—\$5·40 to \$5·50 per bag.  
 SUGAR—Yellow crystals, \$2·25 to \$2·50; molasses, \$2·00 to \$2·25 per 100 lb.





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## Banana Industry in Great Britain.

**B**ANANAS from a commercial point of view' is the title of an interesting paper by Mr. Frank Pink in the December issue of the *Journal of the Royal Horticultural Society*. In this paper, Mr. Pink deals primarily with the methods of handling and disposing of bananas.

In a brief sketch of the rise and progress of the industry, Mr. Pink states that, although the banana has been known for centuries, it is only during recent years that it has found its way into Great Britain. The suggestion that bananas should be shipped from the Canary Islands to England was first made by a gentleman who was staying in the Islands for the benefit of his health. After many failures in the early stages, a sound trade was founded, with the result that, as recently stated in the *Agricultural News* (Vol. V, p. 217), the banana industry in the Canaries is now of the annual value of about £450,000.

'Until about four years ago, the monopoly of the banana business was held by the Canary Islands, when Sir Daniel (then Dr.) Morris, the Imperial Commissioner of Agriculture for the West Indies, induced the Government to offer a subsidy for a direct line of steamers to run to and from Jamaica, and to bring over every fortnight not less than 20,000 bunches of bananas.

'A contract was entered into with Sir Alfred Jones, the Chairman of the Elder Dempster Line, and the importation of Jamaica bananas commenced. At the time it was thought that the industry of the Canary Islands would be seriously damaged, but methods there have been improved, and the public demand for the fruit has increased to such an extent that I think I may correctly state that the Canary banana industry is now as flourishing as it ever was.'

Mr. Pink's remarks on the kinds of bananas which can be sent to Great Britain are reproduced in full elsewhere in these columns. The kind that is most generally preferred is the *Musa Cavendishii*, grown in



the Canary Islands and Barbados. The 'Gros Michel' banana, the variety grown in Jamaica and Costa Rica, is much coarser in flavour, but, being much more hardy, will stand rougher handling. The 'Claret' or red-skinned banana, Mr. Pink thinks, is likely to become better known before long. The very delicate skin of the 'Lady's Finger' or fig banana prevents it from being placed on the English market in good condition.

In regard to the difficulties of transport, it is remarked that 'freight usually costs four or five times as much as cultivation.' Bananas are carried to England from the Canary Islands in from five to seven days. As no special facilities are provided for keeping them cool in summer or warm in winter, large quantities are spoiled. The voyage from Barbados takes from eleven to twelve days, and the fruit is brought in holds cooled by powerful fans, and in some of the ships by refrigerating machinery. 'As the temperature of the holds must not go above 70° F. for any length of time, nor below 55° F. at all, it can easily be seen that the question of transport is a difficult one.' From Jamaica the voyage takes about twelve to fourteen days, and from Costa Rica three days longer; the bunches are carried unpacked in special chambers cooled by refrigerating machinery of the latest type. The specially fitted steamers can bring from 35,000 to 45,000 bunches on each voyage.

Mr. Pink then proceeds to deal with the methods of collecting and shipping the fruit. In the Canary Islands the fruit is purchased by native merchants or by the buyers of English firms, who pack it themselves and take all risks in shipping. In Jamaica and Costa Rica the bulk of the fruit is bought from the growers by the American Trust. The method in vogue in Barbados, which has been previously described in the *Agricultural News*, is characterized as 'the best and most economical system of all.'

For handling bananas in England, specially constructed rooms are required, in which the temperature can be easily regulated. The crated bananas are usually ripened by the importers, and sent out when nearly ready for consumption. If the bunches are not packed, they are immediately despatched to the dealers who usually ripen them in special rooms.

It may be of interest to supplement the information supplied by Mr. Pink with a few remarks on the sources from which the banana market of Great Britain is supplied. In the year 1905, Great Britain received 2,237,779 bunches from Costa Rica and 1,814,123 crates from the Canaries. During the year ended March

31, 1906, Jamaica shipped 1,217,901 bunches to the same market. It should be added that this number is only about one-eleventh of the number of bunches sent from Jamaica to the United States in the same period.

The phenomenal increase in the consumption of bananas in Great Britain has frequently been referred to in the *Agricultural News*. As was recently stated, this increase is being maintained and the number of bunches imported in the year 1906 probably exceeded 7,000,000.

## SUGAR INDUSTRY.

### Raising Seedling Canes in Java.

The following is an abstract of a paper by Dr. J. D. Kobus in the *Archief voor de Java Suikerindustrie* 1907, No. 1:—

The series of experiments described was carried out in order to ascertain whether cane plants, propagated asexually by cuttings and chemically selected for their richness in sugar, would transmit this richness to their offspring when propagated by seeds.

The varieties chosen for experiment were the well-known Java cane, Cheribon, and the East Indian cane, Chunnee. From the fact that the Cheribon bears normal ovaries but has infertile pollen, while the Chunnee has fertile pollen, these two canes have been the parents of most of the Javanese seedlings.

In 1904, by chemical selection, plants of both Cheribon and Chunnee canes were found which were rich in sugar, and others poor in sugar. In one part of the experimental grounds a number of furrows were alternately planted with poor Cheribon and poor Chunnee. In another part of the grounds cuttings of rich plants of both kinds were alternated in the same way. These two lots were separated from all other canes by the tall-growing cane L. 3, which does not arrow.

In 1905, the experimental canes arrowed well and produced much seed. The seed (from the Cheribon arrows) was sown, and over a thousand seedlings of each of the two crosses (poor Cheribon by poor Chunnee, and rich Cheribon by rich Chunnee) were planted out in alternate rows, in separate plots, of (two or) four rows each, in order to eliminate the effects of differences of soil.

No difference was visible to the eye in the growth of the offspring of rich or poor plants. In July 1906, when they were about thirteen and a half months old, they were all cut, plant by plant, and the juice of each of the 2,600 was analysed. When the average weight of cane and percentage of available sugar of the seedlings of poor parents and of rich parents in each of the thirty-eight plots of four rows each are calculated, the following interesting results are obtained:—

Among the thirty-eight corresponding pairs there were only seven occasions on which the seedlings from rich plants contained less sugar than those from poor plants, and the same number on which the former weighed less. Almost always the rows of the rich group produced more and richer canes than the juxtaposed rows of the progeny of poor canes in the same plot.

When the analyses of individual plants are arranged in order of richness in available sugar, it is found that there are many more rich plants among the descendants of the rich group than among the descendants of the poor group.



With percentages from 14 on to 20, the seedlings of the rich canes are always in greater numbers, especially in the highest percentages. The average percentage of available sugar in all the 1,300 seedlings from rich canes is 11.77; that of all the 1,300 seedlings from poor canes is 10.89.

If all the 2,600 plants of the two groups are arranged in order of weight of cane, the following results are obtained: Plants lighter than 6 kilograms make up 40.7 per cent. of the poor group, and only 26.9 per cent. of the rich group. Between 6 and 9 kilograms, the numbers are the same. Above 9 kilograms, the seedlings of the rich group preponderate fairly regularly. Above 25 kilograms, there are seventeen of the rich and only six of the poor. The average weight of the rich group is 9.32 kilograms, that of the poor group only 7.69. Since the average percentages of sugar in rich and poor are as 11.77 to 10.89, the total amounts of sugar produced are as 131 to 100, which shows a marked advantage on the side of seedlings from plants rich in sugar.

Plants over 20 kilograms in weight have in the rich group 13.48 per cent. of sugar, and in the poor group 12.39 per cent. Considering, on the other hand, the richest of the plants in both groups, viz., with 17 to 20 per cent. of sugar, they are each, on the average, about one and a half times as heavy in the rich as in the poor group. This is a much greater difference than was calculated above from the average of all the plants.

The most conspicuous difference, however, is that there are in the rich group 100 individuals with over 17 per cent. available sugar, as against only thirty-three in the poor group. The chance of producing such rich offspring is three times as great with seedlings from rich canes as with seedlings from poor canes. It can therefore be anticipated that, by selecting the canes chemically before crossing, improved varieties can be raised more quickly than in the past.

### British Guiana.

The following review of the sugar industry in British Guiana is extracted from the *Annual Colonial Report*, for 1905-6:—

The bulk of sugar exported was more than in 1904-5, but the value was less. The average value for last year works out at £10 7s. 5d. per ton, as compared with £12 in the previous year.

The increase in the rum export amounts to 865,203 proof gallons, representing a value of £45,320.

The sugar crop for export amounted to 116,550 tons, as against 106,716 tons for the previous year. The total area in canes at the end of March, exclusive of land cultivated by cane farmers, was 72,390, as compared with 70,880 at the close of the previous year.

Work on the experimental cane cultivation at the Botanic Gardens, under the charge of the Board of Agriculture, continued during the year. Cultivation of the new varieties of cane on the sugar estates of the colony received still greater attention on the part of the planters generally, and the area occupied by these experiments increased from 14,800 acres in the previous year to 20,000 acres. Practically all the sugar estates of the colony continue to take part in this work.

The usual consolidated returns of the results of the experiments on the sugar estates undertaken on the manufacturing scale were published during the year. These returns indicate that a steady advance is maintained and that new varieties produced in the colony not only exceed the standard variety in yield of sugar per acre, but show greater resistance to drought and disease. These large-scale experiments are being continually increased.

### PERMANENT EXHIBITION COMMITTEES.

The following is extracted from the *West India Committee Circular*:—

The formation of permanent exhibition committees in the several West India Islands marked a distinct advance in the realization of the good to be derived from advertising the commercial and tourist capabilities of the colonies. . . . We have often put forward the great good derivable from industrial exhibitions, and the fact is now so generally recognized as to make any reference to it one of supererogation. Still, it may safely be said that only recently have the West Indies really become alive to this fact, and the permanent exhibition committees have resulted. The West Indian court at the Colonial Exhibition in 1905 was a great success, but it would have been a greater success still had these committees been then in existence. The recent Dominica fruit display at the Royal Horticultural Society's show of colonial fruit, formed an excellent illustration of the value of permanent committees. We may safely say that no West Indian exhibit of its kind has been so well and cheaply done, and at the same time served its end so satisfactorily as this one has, and the fact that this has been the case may be attributed to the care, attention, and organization of the permanent committee of Dominica. But something more is wanted than the formation of these committees, and that is communication between them with the view to unanimity in representation. A Barbados exhibit is good, a Dominica exhibit is good, and a Jamaica exhibit is good, but the greatest good is derived from the union of them all. No British exhibition dealing with the colonies should be without a West Indian court, and that court should contain sections representing not only every West Indian Colony, but every industry and interesting feature in connexion with them. This can be brought about only by unanimity of view and action among the permanent committees on the other side. These should act not merely for their individual colonies but for the West Indies as a whole as well. We cannot too strongly emphasize the fact that the interest of any one colony is bound up in that of the whole. In a united exhibition the special characteristics of one section contrast with those of another, to the advantage of all, and we strongly impress upon the permanent exhibition committees the desirability of co-operation in future exhibitions on this side.

There is another matter in this connexion to which attention should be drawn, and that is the financial side of the question. At present several of the colonies are compelled to hold aloof from these exhibitions for the sufficiently good reason that no funds are available for the purpose of their participation in them. Now it seems to us that the best way of obviating this difficulty would be for each West Indian Colony to include in its estimates a small vote for the express purpose of exhibitions. The permanent committees would then have some solid basis upon which to work. They would know exactly how much money they had to spend, and would not be obliged to go cap in hand to the Government when each separate exhibition proposal is made. There would be no necessity for a large sum of money, and judging from our experience which we have gained during the past few years, we believe that a great deal could be done with a vote of from £250 to £300 in the case of the larger colonies, and of £100 in the smaller places. We understand that a communication on this subject has already been addressed to the Imperial Department of Agriculture and the honorary correspondents of the West India Committee, and we further commend our suggestion to the serious consideration of our readers.





## WEST INDIAN FRUIT.

### KINDS OF BANANAS FOR THE ENGLISH MARKET.

In a paper on 'Bananas from a commercial point of view,' published in the *Journal of the Royal Horticultural Society*, Mr. Frank Pink makes the following remarks on the kinds of bananas that can be sent to Great Britain:—

That grown in the Canary Islands is the *Musa Cavendishii*, which bears large compact bunches of moderately large 'fingers,' and attains a height of about 10 or 12 feet. The plants are fairly hardy, but the fruit is very delicate, and, in spite of its thick skin, is very sensitive to bruising or low temperatures, in consequence of which it is always shipped carefully packed in crates. In flavour it is rich, and is generally preferred to other kinds. This kind is also grown in Barbados, but there it attains greater perfection, and is of finer flavour and more luscious, probably owing to the soil being richer than that of the Canary Islands.

The variety grown in Costa Rica and Jamaica is the 'Gros Michel,' the plants of which attain a height of 18 or 20 feet, and bear long straggling bunches of large fingers, which are much coarser in flavour than those of *M. Cavendishii*. The plants are less robust than those of the smaller variety, but the fruit is much more hardy, and will stand a lot of knocking about and a moderate amount of cold, for which reason the bunches are always shipped without packing. This is fortunate, for the long bunches require very cumbersome crates to pack them in.

Another kind sometimes seen here is the 'Claret,' which derives its name from the dusky claret colour of its skin, and which, in my opinion, is the best of all, having a very delicious flavour. The bunches are usually very small, with very few fingers on them; but these, being very large, are well worth the price usually charged for them, viz., 2d. each. It is possible that this kind may become better known before long.

Of kinds which are useless for export there are several; and I have often been asked why one, the 'Lady's Finger,' is not sent over. The reason is that the bunches and the 'fingers' of this variety are very small, and the skin of the fruit is so delicate that it is almost impossible to 'market' this banana in good condition.

It is frequently stated that the large fruit seen on the hawkers' barrows and in the shops is not the true banana, but the plantain. This is incorrect, for the plantain is quite a distinct variety, and is generally used as a vegetable. I have never heard of any being sold here.

### TRINIDAD FRUIT TRADE.

The following table shows the amounts of fruit purchased in Trinidad and shipped by the British West Indian Fruit Co., Ltd., to England during the six months ended July 31, 1906. A brief summary of this information was published in the last issue of the *Agricultural News* (p. 41). The Manager reports as follows:—

I visit from time to time all plantations now under cultivation in bananas. I have advised the managers of the various estates as to what I consider should be done for the best cultivation of the plantations, and the most approved methods of harvesting and packing the fruit. I have also inspected the small farmers' cultivations, of which there are a good many around Princes' Town, and helped them in every way. In fact, whenever asked by any planters, I go out in the country and visit their plantations, and give them any instruction or advice that may be useful to them when cultivating fruit. In addition to this, I have assistants who act in the same capacity as myself. I have appointed an agent at Toco, who goes round regularly each fortnight and buys all fruit on the spot and also helps and instructs the peasant proprietors who are cultivating in that district. I also have agents along the railway line who buy all fruit possible each fortnight.

	Bananas. (Bunches.)	Oranges.	Mandarins.	Grape fruit.	Mangos.	Pine-apples.	Cocoa-nuts.	Times.	Cost of Purchase.
February	1,674	47,555	5,860	2,855	—	—	—	—	646.87
March	2,097	20,320	—	—	—	—	—	—	621.79
April	1,089	—	—	—	500	—	—	—	263.21
May	403	—	—	—	1,975	157	—	—	114.85
June	663	—	—	—	3,034	248	900	—	223.66
July	1,392	—	—	—	—	—	5,000	57,675	495.58
	7,318	67,875	5,860	2,855	5,509	405	5,900	57,675	\$2,365.96



## MAMMEE FRUITS.

Confusion often arises as to the two fruits to which the name 'mammee' is applied. These are the 'mammee apple' (*Mammea americana*), and the 'mammee sapota' (*Lucuma mammosa*).

The 'mammee apple,' which is related to the mangosteen (*Garcinia Mangostana*), is a native of the West Indies; it belongs to the natural order *Guttiferae*. Branches of the tree are shown in fig. 2.

This is a handsome tree, 40 to 60 feet high, with large, rigid, leathery, shining leaves, and white, scented, polygamous flowers. The calyx splits into two, disclosing the four to six petals and the numerous stamens. The fruit is nearly spherical, 3 to 7 inches in diameter, with brown resinous exocarp, and one to four large stones covered with fibre and



FIG. 2. MAMMEE APPLE.

(From *The Book of Trinidad*.)

surrounded by an orange-coloured, sweetish, aromatic pulp. This pulp is eaten raw, stewed, or preserved with sugar. It has something of the taste of the apricot, hence the name San Domingo apricot.

This tree supplies a durable timber which is often sufficiently finely grained for cabinet work. The gum is used in the West Indies for extracting chigos. The spirituous liqueur, known as Eau de Créole, is flavoured with a distillation of the scented flowers of this tree. Mammee wine has been prepared from the pulp of the fruit or the sap of the tree.

The 'mammee sapota' or 'marmalade fruit' tree (*Lucuma mammosa*), known also as sapote, grosse sapote, or sapote

à crème, a native of Central America, is related to the sapodilla, belonging to the natural order *Sapotaceae*.

This is a tree 30 to 40 feet high, with fulvous or grey branches, papery, long obovate pointed leaves, and brown egg-shaped fruit. Flowers cream-coloured and silky, in clusters of six to twelve on the bare stem. Calyx with several leaves; corolla tube with five lobes; five staminodes; five stamens; and five-celled ovary. Fruit about 6 inches long, with reddish pulp, and one (or more) polished seeds. The pulp is sweet and resembles in taste that of a luscious pear. It is made into marmalade which is not unlike good apple preserve. The timber resembles mahogany in colour, is compact, and used in house-building.

The common names of this tree are often confused in the West Indies with those of *Mammea americana*, since the appearance of the two is somewhat similar.

Neither of these fruits seems to have been improved by cultivation, and they both appear to offer promising material for improvement by selection.

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## EDUCATIONAL.

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### School Gardens in Queensland.

The *Queensland Agricultural Journal*, for December 1906, contains an account of the provisions for school gardens lately prepared by the Department of Public Instruction in Queensland.

A sum of £250 has been put on the estimates for the purpose of encouraging horticulture, elementary agriculture, and arboriculture in connexion with the State schools. Three prizes are given in each of the twelve school inspectorial districts—first £4, second £2, and third £1. These prizes are awarded for the best-kept or most attractive school grounds or gardens, or for the best agricultural experimental work or the like. The prize-money is to be expended by the teachers in further improving the school grounds, in the purchase of implements, etc. The Department of Agriculture will include in the *Agricultural Journal* a school section of one or two pages, which will contain simple and useful hints to teachers and scholars in matters of interest with regard to agriculture, seed testing, dairying, school gardens, tree planting, and cognate subjects.

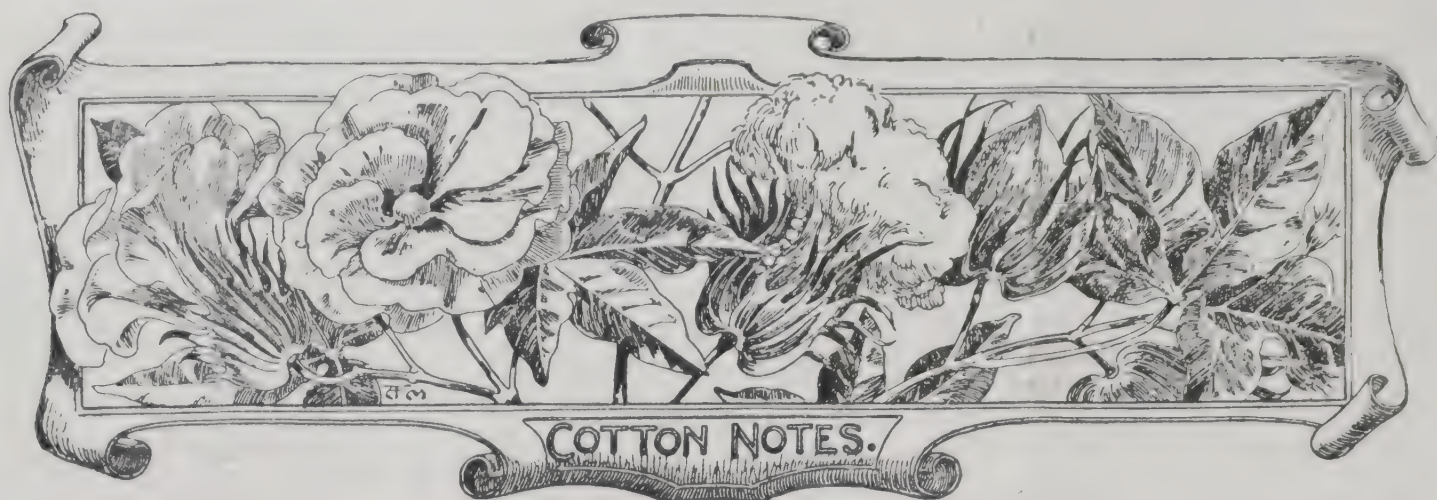
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### School Agriculture.

The *Agricultural Gazette* of New South Wales, for November 1906, contains an account of the methods of teaching agriculture to the infant classes in the public schools of that State:—

A level, well-dug piece of land is divided into rows of small plots, 3 feet square, with 15-inch paths between the rows. Each plot is enclosed by 3-inch by 1-inch planks. Each plot has the 3-foot board next one path marked into feet and inches by saw cuts, and is numbered on this side. All pupils stand on this side of the plot, so as to face the teacher. They are each taught to measure the length of the span of the right hand between thumb and first finger, and thumb and little finger. The beds are only allotted to deserving pupils. The plants are neatly arranged, the large ones in the centre, and the smaller ones radiating to the outer edge. All the instructions in planting, sowing, use of tools, etc., are given simultaneously.





### COTTON IN CARRIACOU.

His Honour the Commissioner has forwarded the following information relative to the acreage in cotton cultivation in Carriacou:—

Owing to the terrible drought experienced here during the first half of 1906, followed by heavy floods during July, August, and September of that year, cotton planting was seriously interfered with. Indeed, many of the peasants who had lost their entire cultivation from the latter cause, did not finally succeed in establishing cotton plants until late in November.

Mr. Archer, of Craigston estate, has about 10 acres of Sea Island cotton, and in various parts of the island the peasants have plots of this variety, amounting in the aggregate to about 60 acres.

Of Marie Galante cotton, I estimate that there are upwards of 2,500 acres under cultivation.

Owing to the causes mentioned, the cotton crop this year will be abnormally late, and I do not anticipate that the results will be by any means as satisfactory as last year.

### COTTON IN BRITISH GUIANA.

The Demarara *Argosy*, for January 19, 1907, contains a report by Mr. R. Ward, Agricultural Superintendent, on the trial plantings of fourteen kinds of cotton during 1903-6. The soil was a stiff clay on the coastlands. The following are the chief results:—

(1) Buck, Kidney or Brazil, and Native Sea Island are three native perennial cottons. The last two have short, poor lint. None of the three yielded large returns in the experimental field.

(2) Introduced Sea Island did well up to the flowering stage, but the bolls failed to develop properly, and only one-third of the lint was of any value.

(3) Introduced Upland did fairly well, but the seed deteriorated and on account of its short staple it is not a promising variety.

(4) Black Peruvian is perennial, and gave its best returns after the third pruning, but, on the whole, the yield was unsatisfactory.

(5) Four Egyptian varieties were tried, viz., Mitafifi, Janovitch, Abassi, and Hamuli. These resembled the Sea Island in their failure to develop their bolls.

(6) King and Russell Big Boll were grown from seed obtained from British Honduras. These produced bolls freely and are Upland varieties.

(7) Caravonica cotton, three varieties. These are stated to have made satisfactory growth and bearing, but the lint varied in each individual seedling; this was to be expected since this cotton is a late cross between Black Peruvian and Sea Island.

### PICKING AND SORTING COTTON.

In order to facilitate the proper handling of cotton on estates in the West Indies, a little more organization and careful attention to details would be of service. It may be of value to cotton planters if an outline is given of the handling of seed-cotton on a well-organized estate:—

The labourers (usually women and children) are divided into two gangs: (1) a picking gang and (2) a sorting gang. The picking gang is necessarily the larger, while the most reliable people are reserved for sorting the seed-cotton after it is brought in and weighed.

The pickers should be arranged in parties according to the fields to be picked, with a driver (man or woman, as found convenient) placed at the head of each party. Each field is picked systematically, the pickers passing up one row and down the next until the whole field has been gone over. The driver follows close behind and sees that no cotton is lost on the ground, that all the seed-cotton is extracted from the bolls, and that no unripe bolls are torn open to obtain the cotton. The pickers are usually inclined to pick only the larger bolls and leave the smaller, as they give a little more trouble. This should be checked, as all ripe cotton, whether in large or small bolls, should be carefully gathered at one time. All stained or immature cotton should be placed in a separate bag.

The seed-cotton is brought from the field and delivered at the house, where it is received by an overseer who examines and weighs it, and should any of it have been badly picked the picker is required to go over it and carefully sort it.

When, ultimately, the overseer has accepted the seed-cotton, it is first of all sunned and afterwards handed to the sorters who carry out their work under the direct supervision of the overseer. These people examine carefully and clean the seed-cotton so as to produce an even sample ready for ginning. They also make up the different grades and qualities ready to be bagged and marked. Care is necessary in marking each bag so that the different qualities may be kept distinct at the ginning factory. A good plan would be to send to the factory only one grade at a time—say, the first grades in the earlier part of the season, and the second and third grades, including the stained cotton, towards the end of the season.

If managers severally would make up their minds to organize the cotton picking and sorting as suggested above, and devote their personal attention to details at the beginning of the picking season, there is no doubt that the work would go on smoothly and satisfactorily, while the increased prices obtained for the crops (the sweet solace of labour) would more than compensate them for the time and trouble devoted to the work.



## WEST INDIAN COTTON.

Messrs. Wolstenholme & Holland, of Liverpool, report as follows, under date of January 28, 1907, in regard to West Indian cotton:—

Since our last report, West Indian Sea Island cotton has been in good demand, and all offerings have been readily taken at firm prices. Clean cotton with fine staple commands 23*d.* to 24*d.*

Carolina planters are holding all crop lots nominally for 25*d.* per lb., but they periodically sell about 50 bags at a time at 22½*d.* per lb.

## SEA ISLAND COTTON MARKET.

The 'Sea Island Cotton Report' of Messrs. Henry W. Frost & Co., of Charleston and Savannah, dated January 26, 1907, has the following:—

*Islands.*—There was some demand during the week for the planters' crop lots, resulting in the sale of four crops at 40*c.* to 45*c.*, aggregating only 69 bags. Factors are, in some instances, disposed to make concessions to sell.

The supply of odd bags, classing fine to extra fine, is very nearly exhausted. The unsold stock consists principally of planters' crop lots held at 40*c.* to 50*c.*, and some small lots of tinged and stained cotton held at 30*c.* to 34*c.* The market closed very quiet.

A week later the same firm reports:—

There was a moderate demand during the week, resulting in sales of three planters' crop lots at 40*c.* to 45*c.*, aggregating 116 bags, the buying being for France. However, since the close of the exchange report, further sales of crops, amounting to nearly 200 bags, have been made on private terms for the north, about on a basis of the above. The factors made concessions to sell, as the planters, in some instances, are anxious to close their accounts.

There was no demand for the tinged and stained cotton held at 34*c.* and 30*c.*

## CARAVONICA COTTON.

In reply to a request from the Imperial Commissioner of Agriculture to be supplied with information as to the variety of cotton produced in Queensland and known as Caravonica, of which mention was made in the *Agricultural News* (Vol. V, p. 358), the Secretary of the British Cotton-growing Association has written as follows:—

Your letter with enclosure relating to Caravonica cotton to hand. This cotton, which is probably a hybrid of Sea Island and Rough Peruvian, does not at all compare with the West Indian Sea Island. The statement that 'of all the cottons collected by the Association the Caravonica was adjudged the most valuable, etc.' is not correct. It is very undesirable that any of this seed should be used in the West Indies, as the cotton lacks most of the essential characteristics of Sea Island.

The following is an extract from a letter from Messrs. Wolstenholme & Holland, of Liverpool, to the British Cotton-growing Association, dated December 28, 1906:—

In reply to your inquiry, the Caravonica cotton referred to sold at 9*d.* per lb., and the owner has been offered 9½*d.* for the following crop, which is now worth 10*d.* owing to the present scarcity of Peruvian.

## EXPORTS OF WEST INDIAN COTTON.

The following is a statement (furnished by the Customs Department in each case) showing the amount and estimated value of Sea Island cotton exported from the various West India Islands for the *quarter* ended December 31, 1906:—

Island.	Bales.	Weight in pounds.	Estimated value.
Barbados ...	164	73,289	£3,664
St. Kitt's ...	35	11,564	578
Nevis ...	13	2,876	144
Montserrat ...	8	2,450	123
Anguilla ...	8	2,000	100
Antigua ...	4	678	34
Trinidad and Tobago (Marie Galante) ...	—	895	19
St. Vincent ...	78	27,213	1,361
Total ...	310	120,965	£6,023

No cotton was exported during the quarter from Grenada, Virgin Islands, St. Lucia, and British Guiana. The returns from Jamaica have not yet been received. The returns for the previous quarter were published in the *Agricultural News*, Vol. V, p. 406.

## THE WINGED BEAN.

Mr. I. H. Burkill contributes to the *Agricultural Ledger*, 1906—No. 4 (Calcutta), an account of the history, uses, and cultivation of the winged bean, also called Goa bean (*Psophocarpus tetragonolobus*). As this bean can be grown in the West Indies, the following extracts are likely to be of interest:—

This plant is doubtless a native of the Malay Archipelago. It has probably been introduced into India, Mauritius, and Guam. It is an annual, living eight or nine months. Its flowers are pale-blue inside and are followed by long, square pods with four wings. The root is large and fleshy like an oblong turnip. There are several varieties, distinguished by length of pods, breadth of wings, and colour of seeds.

The pods, while still green and tender, are cut into short segments and cooked, being used like French beans, to which they are but slightly inferior in flavour. The ripe beans can hardly be eaten, as they are said to make the head heavy. The roasted seeds are used as food in Java. The fleshy root is dug up before any seeds are allowed to ripen, and boiled. It is eaten by the Burmese, without cooking, between meal-times as a delicacy. It is slightly sweet, firm like an apple, and by no means unpleasant. In Burma, roots of standard size sell for ½*d.* to 1*d.* each. If seeds are allowed to ripen, the roots get dry and less pulpy. The plant likes a considerable quantity of moisture.

In the Shan States it is planted at the beginning of the rains, often in forest clearings. It is allowed to climb on a support and grows 10 feet to 12 feet high. The root may be dug and eaten, or the plant may be allowed to produce young beans.

In Yamethin, Burma, this plant is cultivated chiefly for its roots, of which the yield is from 1½ to 2 tons per acre. A quantity of the young beans are sold from the same fields. The plants are allowed to trail and not trained on sticks.



## EDITORIAL NOTICES.

Letters and matter for publication, as well as all specimens for naming, should be addressed to the Commissioner, Imperial Department of Agriculture, Barbados.

All applications for copies of the 'Agricultural News' should be addressed to the Agents, and not to the Department.

*Local Agents:* Messrs. Bowen & Sons, Bridgetown, Barbados. *London Agents:* Messrs. Dulau & Co., 37, Soho Square, W., and The West India Committee, 15, Seething Lane, E.C. A complete list of Agents will be found on page 3 of the cover.

The *Agricultural News*: Price 1d. per number, post free 2d. Annual subscription payable to Agents, 2s. 2d. Post free, 4s. 4d.

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# Agricultural News

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VOL. VI. SATURDAY, FEBRUARY 23, 1907. No. 126.

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## NOTES AND COMMENTS.

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### Contents of Present Issue.

The editorial in this issue contains information on the banana industry of Great Britain.

It is shown by experiments carried out in Java that the chemical selection of sugar-canes before crossing is likely to lead to the production of a larger proportion of improved varieties (pp. 50-1).

A note on the kinds of bananas in which a trade can be done in Great Britain appears on p. 52.

The mammee apple (*Mammea americana*) is sometimes confused with the mammee sapota (*Lucuma mammosa*). A comparison between the two trees will be found on p. 53.

In a note on p. 54 hints are given on the proper handling of seed-cotton on estates. On this and the following page will be found several notes of interest to cotton growers.

References to insect pests in St. Kitt's-Nevis are made in a recent report by the Entomologist (p. 58).

The general report on the half-yearly examination of the pupils of the St. Vincent Agricultural School is published on p. 59.

In his Cantor Lectures on Artificial Fertilizers, Mr. A. D. Hall made a useful comparison between nitrate of soda and sulphate of ammonia as sources of nitrogen (p. 61).

### Seedling Canes in Jamaica.

New seedling canes are raised annually at the Hope Experiment Station. According to the report of the Director of Public Gardens and Plantations, for 1905-6, thirty Jamaica seedlings, grown from seed collected in 1902-3, have been propagated for further selection. Tops of B. 208 received from Barbados were planted out to the number of 1,970.

The total number of tops and cuttings distributed from the station during the year was 113,089.

The seedlings B. 208, B. 147, and D. 95 have each given excellent results on different soils. B. 208 appears to be the most promising variety for general cultivation in Jamaica.

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### Rice Industry in British Guiana.

In reference to the note in the last issue of the *Agricultural News* (p. 41) on the progress of the rice industry in British Guiana, it may be of interest to add that, according to the *Annual Colonial Report*, for 1905-6, the local production of rice has caused a still further reduction in the amount of this article imported. While ten years ago the imports amounted to 21,583 tons, in the year under review only 5,932 tons were imported.

This report states: 'The rice industry has continued to make rapid strides. The supply will shortly exceed local demands, and the time has arrived when an outlet must be found for the daily increasing output. To this end an export trade with Barbados has already been started, and endeavours are being made to establish a market with the neighbouring island of Trinidad.'

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### Smoking Rubber.

It has been found that plantation rubber, though it contains much less water than the best Brazilian Para, is not so elastic. The latter, after being stretched, returns immediately to its original shape, while the former often does so but gradually. It was found at the Ceylon Rubber Exhibition, 1906, that the elasticity of plantation biscuits was improved by smoking them. So much was this the case that a special gold medal was awarded for smoked biscuits.

A special apparatus has been devised in Ceylon for smoking latex. The filtered latex passes over a series of baffle plates exposed to smoke from a fire of nuts of *Attalea excelsa* or *Maximiliana regia*. This smoke contains creosote and acetic acid. The latter effects the coagulation of the latex. Rubber made from latex to which a little creosote solution has been added is said to be more elastic.

But part of the superior elasticity of Brazilian Para may be due to the method of preparing it in successive layers. The outer layers, by shrinking, produce a great pressure on the inner layers. Similarly, rubber blocked in a press produces perfectly elastic strips. Hence the superior elasticity of wild Brazilian Para seems to be due to the antiseptic properties of creosote, and the condensation resulting from pressure.



### Liverpool Colonial Products Exhibition.

The next Colonial Products Exhibition will be opened in Liverpool by the Earl of Elgin on March 12.

It is satisfactory to note that three of the West India Islands will be represented. A comprehensive exhibit of the products of Montserrat was forwarded from that island on February 11. Exhibits have also been sent from Antigua and Barbados.

The presence of these exhibits in Liverpool, where a considerable trade is carried on in West Indian products, especially lime juice and cotton, cannot fail to prove of advantage to these colonies.

### Nitrification.

The following are the principal results of experiments on nitrification carried out by Mr. S. F. Ashby, B.Sc., Carnegie Research Fellow, Rothamsted Experiment Station (now Fermentation Chemist in Jamaica) an account of which is published in the *Journal of Agricultural Science*, Vol. II, part 1 :—

The use of the base (usually carbonate of lime) in nitrification is to form carbonate of ammonia, which is alone directly nitrifiable. This reaction is more rapid with carbonate of magnesia, and so it is found to start nitrification several days sooner than carbonate of lime. Ferric hydrate (iron rust) can also serve as a base for nitrification, but the nitrification is never complete.

The double ammonia combination formed by the absorption of ammonia salts by clay (modelling clay) can most probably be nitrified in the absence of any base.

Salts of ammonia inhibit the oxidation of nitrites to nitrates, but this action can be largely obviated by abundant inoculation of the nitrobacter.

### The Poison of Cassava.

The following notes are taken from a paper by Messrs. Dunstan, Henry, and Auld on Cyanogenesis in Plants, Part V, published in the *Proceedings of the Royal Society, B.*, Vol. 78, 1906 :—

The many varieties of cultivated cassava are regarded as belonging either to the bitter species, *Manihot utilissima*, or to the sweet species, *Manihot Aipi*. When cultivated beyond the tropical zone they become much less poisonous. In A.D. 1764, there is an account of 50 lb. of cassava juice being distilled; 3 oz. of distillate were obtained, and thirty-five drops of this killed a man at once.

Analyses by Francis and by Carmody show that in the West Indies the bitter cassava has the hydrocyanic acid distributed throughout the root, while in the sweet cassava the poisonous principle is chiefly in the rind.

Bitter cassava root sliced and dried yielded from the root 0.009 per cent., and from the rind 0.035 per cent. of hydrocyanic acid. The glucoside, by the decomposition of which the hydrocyanic acid arose, was isolated by alcohol and ether, and was determined to be identical with phaseolunatin from Lima bean seeds. It gave off, when hydrolysed, acetone and hydrocyanic acid. A chloroform extract of the cassava root, precipitated with alcohol, yielded an impure enzyme, which readily decomposed amygdalin and phaseolunatin.

### Future Production of Rubber.

The following information is abstracted from a lecture by Mr. Herbert Wright at the Ceylon Rubber Exhibition, 1906 :—

Presuming that the demand for rubber should increase at the rate of 5,000 tons of wild rubber a year; that each tree of a plantation yields only  $\frac{3}{4}$  lb. a year, and there are 150 trees to an acre; that 5,000 tons of wild rubber equal in caoutchouc contents 4,000 tons of plantation rubber, and that the supply of wild rubber remains constant at 60,000 tons per year; then it follows that in ten years' time the cultivated area required will be only 960,000 acres.

But the Indo-Malayan region alone has planted 250,000 acres in rubber. Large concessions have been granted for rubber planting in Africa, South America, Central America, West Indies, etc. This calculation is based on the minimum yield per acre; a higher yield would mean a reduction in the cultivated acreage required. If the increase in consumption is much more rapid, then the prospect for the cultivation of rubber in the tropics is probably considerably brighter.

### Preserving Eggs in Water-glass.

The *Journal of Agricultural Science*, for January 1907, contains an account of a research into this method of preservation by Mr. J. Hendrick, B.Sc., of the University of Aberdeen.

This method was introduced comparatively recently, but has largely superseded other methods. Water-glass is a silicate of soda with a strong alkaline reaction. It is sold, for preserving eggs, in the form of a thick syrup, which may be mixed with ten or twelve times as much water. The eggs should be put in the dilute solution the same day as they are laid, and left there until they are required for use. They may be so left for four years. The shells of eggs preserved in water-glass have a clean, fresh appearance. The contents of the eggs do not shrink, while the cost of preservation is exceedingly small.

Eggs which have been preserved in water-glass up to six months are unaltered in taste and appearance, either when raw or cooked. After this a slight change sets in. In three or four years the white of the egg becomes pinkish and more liquid, and the egg then tastes slightly, but not unpleasantly, alkaline. There is then also a slight odour in the cooked eggs, but not a stale or bad odour. At the end of one year there is hardly a noticeable change.

Fresh and preserved eggs were analysed. The only difference was a slight increase of soda (about 0.1 per cent. in three years) in the preserved eggs. Analyses of the shells of fresh and preserved eggs show that the main difference is the increase of silica in the latter (amounting to 2 per cent. in three years). This silica probably blocks up the pores of the egg-shells and renders them less permeable.

A solution of water-glass seems admirably suited for keeping fresh eggs in the West Indies. Its use has advantages over the methods of smearing the shell with fat, or of keeping the eggs in milk of lime.





## INSECT NOTES.

### St. Kitt's-Nevis.

The following extracts, taken from Mr. Ballou's report on his recent visit to St. Kitt's-Nevis, contain interesting references to the insect pests prevalent in that presidency:—

The Botanic Station shows great improvement in all respects since my previous visits, both of which occurred in times of serious drought, while previous to the time of this visit a fairly abundant rainfall had occurred. The following were the most noticeable among the instances of insect attack:—

A group of sapodilla trees of several varieties was seriously attacked by scale insects and black blight. The most abundant of the scales were the mango shield-scale (*Lecanium mangiferae*) and the akee fringed-scale (*Asterolecanium pustulans*), while the glassy star-scale (*Vinsonia stellifera*) and the green shield-scale (*Lecanium viride*) were also present. These trees were so thoroughly infested that it was considered a good opportunity for testing the efficiency of the kerosene and whale-oil soap emulsion. The first application was made during my visit to Nevis, and a considerable improvement was noticeable on my next visit to the Botanic Station. Another application was to be made soon after.

A camphor tree growing in the station was severely attacked by a boring insect. Every shoot was attacked, and the tree was reduced to the condition of a shrub consisting of a few shoots growing from the base of the original trunk. The larva which does the damage was found, but the pupa and adult were not to be obtained. The insect is evidently Lepidopterous, the larva (probably nearly full-grown) measuring about  $2\frac{1}{2}$  inches in length and  $\frac{1}{4}$  inch in diameter at the largest point. The colour is whitish with dark mouth-parts and a dark shield on the dorsal surface of the prothorax. I have asked Mr. Shepherd to try to rear the adult, in order that it may be identified, as it would be a serious pest in any locality where camphor trees were grown to a large extent.

Spraying had been carried out at the Botanic Station in a satisfactory manner. In several instances plants on which scales were found were carefully examined and only dead specimens were to be seen.

The outbreak of a serious attack of wood ants (Termites) on sugar-cane has previously been mentioned in the *Agricultural News* (Vol. V, p. 138). The portion of the field attacked by termites was cut and burned and prepared for cotton. This course was recommended in the belief that the roots of the cotton would not be attractive to the termites, which would consequently be starved out, so that later, canes could be again grown on the same land, if so desired.

At Lodge estate, I saw the field of sweet potatoes which had been seriously attacked by caterpillars, and to which reference was made in the *Agricultural News*, Vol. V, p. 314.

Various devices have been used in Nevis for dusting Paris green. One of these, a tin with a fine-mesh wire screen at the bottom, is said to be useful and fairly economical of material. I am of opinion, however, that it is not so desirable as the Acme powder bellows, which was shown to the planters on nearly every estate.

The conditions in Nevis are such that the control of the leaf blister-mite is one of the prime factors in the success of the cotton industry. At the present time, cultural methods seem to be most efficient in Nevis, and the chief of these is the principle of destroying all old cotton *at once* on the completion of the crop; that is, on the completion of *one* picking. This would allow a considerable time before the next planting, and would be of great assistance in keeping down the leaf blister-mite. Where this was not done after the crop of last year, the young cotton of the present growing crop showed signs of leaf blister-mite earlier than in cases where no old cotton was standing near the newly planted crop.

### Whale-oil Soap Emulsion.

The kerosene and whale-oil soap emulsion, mentioned above as having been used in spraying sapodilla trees, was made as follows:—

Ten pounds of whale-oil soap were boiled in 20 pints of water till the soap was thoroughly dissolved. It was removed from the fire, and 12 pints of kerosene were added while the soap mixture was still hot, and churned violently until an emulsion was formed. This was then made up to 25 gallons and applied as a spray. Mr. Shepherd reports that the wash was used on the sapodillas with great success, and he thought another application would make them right.

This mixture is not a new one in the West Indies, but the successful results in this case, where there were present several different species of scales, would indicate that it is worthy of more extended use.

### Fumigation of Plants.

According to a proclamation published in the *Official Gazette*, of February 9, St. Lucia is to have, from March next, a system of fumigation of imported plants to guard against the introduction of insect pests.

This is intended to fall in with the general practice in the West India Islands. Ordinances now in force, with the dates of their proclamation, are as follows: Jamaica, 1901; Dominica, 1904; Barbados, 1905; Antigua, 1905; St. Vincent, 1906; Grenada, 1906; Montserrat, 1906. These colonies have suitable fumigation chambers for the purpose, and in every instance the work of fumigation or disinfection (in certain cases) is in charge of the local agricultural officer. In St. Kitt's-Nevis and British Guiana legislation of a similar character is under consideration.

### DEPARTMENT NEWS.

The Imperial Commissioner of Agriculture left Barbados in R.M.S. 'Esk' on February 12, on an official visit to confer with the Governor-in-Chief of the Windward Islands at Grenada, and to attend the Agricultural Show held at Grenville on February 14 and 15. Sir Daniel Morris returned to Barbados on Tuesday last.

Mr. F. A. Stockdale, B.A., Mycologist and Agricultural Lecturer on the staff of the Imperial Department of Agriculture, left Barbados in R.M.S. 'Esk' on February 12, to inspect the Agricultural School at St. Vincent. Mr. Stockdale returned to Barbados on February 19.





### ST. VINCENT AGRICULTURAL SCHOOL.

The following is the general report of the examiner (Mr. F. A. Stockdale, B.A.) on the recent half-yearly examination of the pupils of the St. Vincent Agricultural School:—

Nineteen boys took the papers set for the junior class, and there were two new boys. McConnie is again top of the juniors with 80 per cent. of the total marks; ten others obtained half marks or over. The average percentage of marks obtained per boy in this class is about 33. This average percentage would be improved if the class were divided, as then more attention could be given to the weakest boys. The work of the first six boys has been satisfactory throughout the year, and therefore I recommend that they be allowed to take the work prescribed for the senior class. By this division, it is hoped that improvement will be shown by the lower boys. Cruikshank is still at the bottom, and should be carefully looked after, especially in Arithmetic and Chemistry. The Arithmetic is again good, three of the pupils obtaining full marks; but, as mentioned in my last report, there is a tendency amongst the boys to cramp their working into a very small space. This is still marked, and should receive careful attention.

Agriculture, on the whole, may be considered satisfactory. The question dealing with Sea Island cotton was answered well by all, which shows that a good knowledge has been obtained of the cultivation of this crop. Botany is again of a fair standard; but, although slight improvement has been made since the last examination, Chemistry is weak, and I recommend that extra time be given to this subject. Geography has improved, but further attention should be given to map drawing, as many of the boys are inclined to be untidy and careless.

The new boys have made a beginning, but careful attention should be given to Composition and Dictation.

### AGRICULTURAL INDUSTRIES OF BRITISH HONDURAS.

The following is extracted from the *Annual Colonial Report* on British Honduras, for 1905:—

The export of bananas was the largest on record, notwithstanding the difficulties attending the fruit trade during the latter part of the year. More land is being taken up for the purpose of this cultivation.

A still more satisfactory feature is the increase in the production of cocoa-nuts. The average export for the years 1896 to 1900 was 2,133,841; for the five years ending 1905 it was 3,818,349. The cultivation is still increasing. Nothing, perhaps, exceeds the cocoa-nut in securing the financial stability of a colony.

Serious attention has been given to the establishment of rubber plantations. These are not yet sufficiently advanced to affect the total of the exports, but most of the trees planted are doing well.

The colony has plenty of land well suited for the cultivation of coffee and cacao. Little has been done in this direction; but the modest attempts at cacao cultivation seem to be successful, as is evidenced by the following figures showing the exports of cacao produced in the colony: 1899, nil; 1900, 892 lb.; 1901, 665 lb.; 1902, 1,078 lb.; 1903, 8,934 lb.; 1904, 14,742 lb.; 1905, 18,998 lb.

## SCIENCE NOTES.

### A New Fruit from Uruguay.

The *Kew Bulletin* (No. 9—1906) contains the following note on a new fruit from Uruguay, *Pouteria suavis*:—

In July of the present year, Kew received from the editor of *Il Giardinaggio* (an Italian horticultural journal, published in Turin), leaves, fruit, and seeds of a South American tree, asking whether it was known to science. This material was supplemented by a paragraph from *Il Giardinaggio*, of which the following is a translation:—

‘Mr. E. Frosio, a horticulturist of Paysandu, Uruguay, in a private letter received by the *Il Giardinaggio*, sends the following interesting note, which we think our readers will like to see:—

“There is a plant bearing a fruit and having persistent leaves, which is certainly endemic in the islands of the Uruguay river and is so peculiar that nobody has yet been able to classify it. The general appearance of the plant is that of a laurel, with leaves which are green and shining on the upper surface. The fruit is about the size of an apricot, but of the shape of an apple; it is yellow and scarlet when mature, and possesses a perfume so delicate that it is equalled in no other fruit. The seed is like a large hazel-nut, but the edible fleshy part of the fruit is small; it has, however, an extremely agreeable taste and possesses such a remarkable digestive property that when the aborigines have over-indulged, they eat freely of this before lying down at night and then they sleep like a child and wake up the next morning with a clear head and a wonderful appetite.”

A scientific description of *Pouteria suavis*, which belongs to the same order as the sapodilla (*Sapotaceae*), is written by Mr. W. B. Hemsley, and the following note is added:—

Steps have been taken to establish this tree at Bordighera, where seeds have been sown in Mr. Garnier's garden. Under cultivation the fleshy part of the fruit may possibly be so increased as to render it acceptable to a circle outside the aborigines of Uruguay.

### Ylang-ylang.

The ylang-ylang tree of the Philippine Islands, whose flowers yield a valuable essential oil, is *Cananga odorata*.

There is also another plant, *Artabotrys odoratissimus*, belonging to the same natural order (*Anonaceae*), the strongly scented flowers of which have an odour which is closely allied to that of ylang-ylang flowers. Sir George Watt says of it, in his *Dictionary of the Economic Products of India*: ‘I can find no record of the uses of this plant.’

*Cananga odorata* is a large, evergreen tree, while *Artabotrys odoratissimus* belongs to ‘a genus of sarmentose or scandent shrubs.’

Both the plants mentioned above are growing in some of the Botanic Stations in the West Indies. At Dominica *Cananga odorata* has produced flowers in great abundance. *Artabotrys odoratissimus* has produced flowers regularly, but not numerously. It has flowered abundantly at St. Kitt's.

During the year 1905, ylang-ylang oil was exported from the Philippine Islands to the value of £18,783, as compared with £17,418 in the previous year. Practically all went to France.





## GLEANINGS.

The *Port-of-Spain Gazette* mentions that a shipment of 43 bags of mangrove bark has recently been received from Demerara. This product is being used in a local tannery.

Mr. H. H. Cousins, M.A., F.C.S., Government Analytical and Agricultural Chemist, has been appointed a nominated member of the Legislative Council in Jamaica.

Recent Trinidad contemporaries refer to the establishment, at the Tacarigua sugar factory, of a plant for preparing cellulose pulp from sugar-cane megass. The cellulose pulp will be shipped in bales for the manufacture of paper.

Not a few estates in Barbados are making 'fancy molasses' for shipment to Canada, the price offered for this locally being 16c. per gallon. (*Agricultural Reporter*, February 16.)

The annual Agricultural Show will be held at Antigua under the auspices of the Imperial Department of Agriculture and the Agricultural and Commercial Society, on February 28.

Mr. S. F. Ashby, B.Sc., a Carnegie Research Fellow at the Rothamsted Experimental Station, has been appointed Fermentation Chemist at the Sugar Experiment Station in Jamaica.

The following palms died after flowering in the Botanic Gardens of British Guiana in the year 1905-6: *Corypha elata*, *Raphia pedunculata*, *Dictyospermum album*, *Arenga saccharifera*, and *Euterpe* sp.

In the report on the Botanic Gardens of British Guiana, for 1905-6, it is stated that grafted mangos were again induced to bear fruit by the root-pruning consequent on digging a trench round the trees.

At a special meeting of the Barbados Agricultural Society held on February 15 to consider what steps should be taken as regards the possible non-continuance of the Brussels Convention, a committee was appointed to draft resolutions to be forwarded to the Secretary of State for the Colonies.

The annual Agricultural and Industrial Show will be held at St. Kitt's, under the auspices of the Imperial Department of Agriculture and the Agricultural and Commercial Society, on Monday, March 5. The Nevis Agricultural Show has been fixed for March 7.

It has been stated in Florida that a budded navel orange tree may be induced to bear fruit at an earlier age by cutting out a ring of bark about  $\frac{1}{4}$  inch broad all round the main stem. The bark gradually spreads over the wound, which causes no permanent harm.

Mr. W. Malins Smith writes from Grenada: 'A few days ago I picked a bunch of "claret" bananas which contained two hands of green-coloured fingers and one hand of both claret and green fingers. There was one finger which was half green and half claret. The green fingers ripened yellow. The bunch when ripe presented a very curious appearance.'

The Barbados sugar market has opened with the offer of \$1.35, equal to 5s. 7 $\frac{1}{2}$ d., per 100 lb. of muscovado sugar. This was the opening figure for last season. At that time the price of beet sugar was about 6d. less than it is to-day, but it is expected that Cuba will eventually put more sugar on the market this year than was anticipated. (*Agricultural Reporter*, February 16.)

The fruits of a large number of species of *Opuntia* and of a few species of *Cereus* are used in quantities for food and may be found in great abundance in the markets of Mexico. A few of the prickly pears produce a fruit which is shipped long distances, and even finds a way to New York markets. A liking for these fruits is an acquired taste. (*Journal of the New York Botanical Garden*, January 1907.)

The common bamboo is often heavily attacked in the West Indies by the bamboo scale, especially in dry locations. This greatly injures the appearance of the plant as an ornament. The Indian solid bamboo (*Dendrocalamus strictus*) is not attacked by this scale. Hence this tall bamboo will show a fine dark green among brown and yellow clumps of the ordinary kind. It also resists drought.

Seventeen brands of so-called 'condensed milk' were examined by a commission appointed by the *British Medical Journal*. Fourteen were made from milk which had had its cream removed, and averaged only 0.72 per cent. of fat. Three had had a small proportion of whole milk added, and averaged 3.14 per cent. of fat. The *British Medical Journal* declares that separated milk is not a proper food for infants.

In Messrs. Schimmel & Co's. last semi-annual report an account is given of experiments on the antiseptic action of more than 100 essential oils. Among other tropical oils, cinnamon oil, cassia oil, and clove oil were specially powerful; bay oil and ylang-ylang oil are recorded as strong; eucalyptus oil and orange blossom oil were medium strong, while citronella and geranium oils were feeble.

A. I. Root's *Gleanings in Bee Culture*, for January 1907, contains an article on wax-rendering, in which it is stated that a new unheated press, the Hatch-Gemmill wax-press, enables yellow wax to be pressed out from cappings or solar extractor refuse, with a loss of less than 3 per cent., if two meltings are made, with two pressings after each melting. Directions are given for putting together a home-made press of this kind, which may be useful to bee keepers in the West Indies.

The tree which yields kapok in Java (*Eriodendron anfractuosum*) is planted for ornament in Burma and on the west coast of India, but has never been exploited there as a source of kapok. On the other hand, considerable effort has been made to introduce to the trade similar kapoks obtained from the common Indian tree *Bombax malabaricum*, and from *Cochlospermum Gossypium*, which occurs in the drier parts of North India. (*Agricultural Ledger*, 1906—No. 5.)



## NITRATE OF SODA AND SULPHATE OF AMMONIA.

The following notes on the use of these two nitrogenous fertilizers are abstracted from a report in the *Journal of the Society of Arts* of the Cantor Lectures on Artificial Fertilizers, delivered by Mr. A. D. Hall, M.A., Director of the Rothamsted Experimental Station:—

The Chilian deposits of nitrate of soda were first utilized in 1830. In 1899, 1,344,550 tons were used. The deposits are estimated to last for twenty to forty years longer. They occur on a practically rainless plateau, about 3,000 feet high. The most probable explanation of their origin is that they were washed out of the soils of the mountains by streams which dried up in the plains.

The soda in nitrate of soda, as well as the nitric acid, is of use to the agriculturist. It acts on the hydrated potash silicates and sets free some potash. At Rothamsted, it was found that potash was thus set free in practically sufficient quantity for mangels and barley for twenty-five consecutive years up to date. Sulphate of ammonia or rape-cake showed nothing of this effect. Thus, at any rate on clay soils, the use of nitrate of soda may enable a potash dressing to be partly or wholly dispensed with.

Nitrate of soda, however, causes deflocculation of clay soils, so that they become sticky after rain, and dry into hard clods. This is found to be due to the presence of a little sodium carbonate. A good remedy is the simultaneous application of superphosphate, or of sulphate of ammonia, both of which produce acids. The application of nitrate of soda seems to reduce the loss of carbonate of lime from the soil. Hence it may well be used on soils which contain comparatively little of this agriculturally important compound.

The source of sulphate of ammonia is the  $1\frac{1}{2}$  to 2 per cent. of nitrogen which is found in coal. In 1901, 220,000 tons were produced in the United Kingdom from gas, iron, shale, coke, and other works. Of this amount, 150,203 tons were exported at an average price of £10 11s. 4d. per ton.

As a nitrogenous manure, sulphate of ammonia is practically as effective, nitrogen for nitrogen, as nitrate of soda. It is also, to all intents and purposes, as rapid in its action, for the process of nitrification, which generally precedes the utilization of the ammonia by the plant, takes place very rapidly in suitable soils. But the sulphuric acid combines with the carbonate of lime in the soil. If the soil is poor in carbonate of lime, the continued use of ammonia salts may induce sterility. The soil may even become actually acid through the withdrawal of ammonia, probably chiefly by fungi. A dressing of lime will at once restore the fertility. It has been found that deep-rooted crops, such as mangels, give a better return with nitrate of soda than with sulphate of ammonia. It has also been found that such crops as barley and mangels, treated with sulphate of ammonia, finish their growth more rapidly than those manured with nitrate of soda. This is explained by the deeper rooting habit induced by the nitrate, which is carried by the drainage waters into the lower layers of the soil. Micro-organisms in the soil are more likely, on the whole, to use ammonia as a food than nitrate, and this would account for the general superiority of the latter. The experiments at Rothamsted do not tend to show that ammonia is specially suited to a wet, or nitrate to a dry, season. On the average, the ammonia salts do better in a dry season. It seems probable that nitrification is checked in a wet season.

## TODD MACHINE FOR CLEANING SISAL HEMP.

The Todd machine has given the best results in the Bahamas in extracting sisal hemp. In reply to an inquiry, Mr. W. M. Cunningham, Curator of the Botanic Station at Nassau, has furnished the Imperial Commissioner of Agriculture with the following useful information in regard to the amount of water necessary to extract a ton of fibre with this machine:—

The Todd machine with which I made the test cleans, on the average,  $\frac{1}{2}$  ton of fibre per day of eight hours; running at high speed, the same machine is capable of cleaning 1 ton per day of ten hours.

Cleaning  $\frac{1}{2}$  ton per day of eight hours, the machine uses 15 gallons of water per minute, or 900 gallons per hour—7,200 gallons for eight hours, for  $\frac{1}{2}$  ton of fibre. Running at high speed, the machine would, I think, use 12,000 to 15,000 gallons of water for cleaning 1 ton of fibre.

The engine used is a Crossley oil engine, 30 h.p. It uses 20 gallons of water per day of eight hours, to clean  $\frac{1}{2}$  ton of fibre; the water used by the engine is principally for cooling the cylinders. I find that this engine does splendid work. For prices and all information regarding it, please apply to Mr. F. W. Menendez, Nassau, Bahamas, who is, I believe, the agent for the West Indies.

A description of the Todd machine was given in the *West Indian Bulletin*, Vol. V, pp. 162-4. The total cost of an outfit to turn out about  $\frac{1}{2}$  ton to  $\frac{3}{4}$  ton of clean fibre per day, consisting of an engine, a single Todd machine, and a steam press, would be about £1,000.

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## PROPER TREATMENT OF DONKEYS.

The following notes on the proper treatment of donkeys are extracted from Leaflet No. 11, New Series, issued by the Royal Society for the Prevention of Cruelty to Animals:—

Not content with over-working and ill-treating him, his character is impugned—'obstinate' and 'stupid' are common epithets applied to him, and they are as unjust as they are common. What animal, either four-footed or two-footed, would not be liable to become stupid or obstinate after years of hard work, hard words, and harder blows? Does not constant ill-treatment provoke such characteristics? A donkey is naturally docile, intelligent, willing, and obedient; capable of strong attachment, and sometimes showing extreme sagacity. If any humane man doubts this, let him rear a donkey from its infancy, for that is the only way to prove its natural disposition, though kindness will always have an effect and soon make a difference in the looks and whole demeanour of the animal. The strength of constitution and great power of endurance possessed by the donkey, as well as its cheapness, make it especially valuable to the poor man. Alas, that these very qualities, instead of rendering the owner grateful for them, should often be taken advantage of in the cruellest manner! Because the hardy beast can do his work with little and coarse food, he is half starved; and because he is patient and meek and never retaliates or revenges himself on a cruel master, he is beaten without mercy; shouted at as if he were deaf, though his ears are sharper than his driver's; often cruelly goaded with sharp sticks (though, happily, that is illegal now); and called obstinate when too weak to draw a heavy load.



## THE JAMAICA EARTHQUAKE.

Dr. Charles Davison, of Birmingham, contributed the following note on the Kingston earthquake to *Nature*, January 24:—

When Port Royal was destroyed by the great earthquake of 1692, some of the surviving inhabitants took refuge on ships, others moved across the haven to a place called Kingstown or Killscown, where, in huts made of boughs, exposed to the heavy rains and in close proximity to hundreds of dead bodies in the bay, they 'died miserably in heaps.' Port Royal was rebuilt and maintained as a naval station; its successor, as a place of business, was founded the following year at Kingston, and by the earthquake of January 14 has now met with a similar, though fortunately less complete, destruction.

The two earthquakes differed considerably in intensity. In 1692, the whole island suffered. Scarcely a house in any part of it was left standing. By numerous land-slips, the mountains were stripped of vegetation and altered in form. The earthquake of that year was one of the first order of magnitude. The most remarkable fact about the recent shock is the very limited area of damage. Kingston seems to have suffered most severely. The more important buildings are ruined, and few, if any, houses have escaped some injury. Port Royal, 6 miles to the south, and St. Andrew, within 5 miles to the north, have shared to a great extent in the ruin; but outside a radius of 10 or 12 miles from Kingston the loss to property is small. Some houses in Spanish Town, 11 miles to the west, are said to be damaged, while Port Antonio, 28 miles to the north-east, and Holland Bay, 38 miles to the east, are almost unharmed.

From the small area of excessive damage and from the rapid decline in the intensity of the shock, it may be inferred that the focus was situated close to Kingston and at no great depth below the surface. Partly to the proximity of the focus, partly also to the sandy or gravelly nature of the ground (for earthquakes are always more strongly felt on loose, friable beds than on hard, compact rock), we must attribute the destructive energy of the shock. That, in its initial power, the earthquake was inferior to those of Valparaiso and San Francisco is clear from the smallness of the meizoseismal area, and also from the comparatively slight disturbances recorded at the observatories of Washington, Shide, and Edinburgh.

The onset of the shock was sudden, there being no warning tremors or sound. For 36 seconds the motion was like that felt on a ship in a choppy sea. All observers agree that the movement was chiefly vertical. It is said that objects jumped from the ground, and this, if it be true, shows how violent was the shock and how close was Kingston to the focus. In many places the ground is fissured, the electric-tram rails are twisted, and the water-supply pipes are partially damaged—all indications of a neighbouring focus. The direct line of cable to Colon is broken about 3 miles from the shore, pointing either to a displacement of the ocean-bed or to a submarine land-slide—probably to the latter, for there were no marked seismic sea-waves on the south side of the island,\* and the shipping in the roadstead and harbour are unharmed. The subsidence of the battery at Port Royal and the sinking of the shore at Kingston show that the superficial beds, at any

rate, have undergone important changes of level.

Whether these changes be due to bodily displacements of the crust, to mere shifting of the surface-beds, or to both is by no means clear. When the island was surrendered to English forces in 1655, the spit, called the Palisados, which now terminates in Port Royal, was discontinuous, and the end resembled one of the cays or small islands outside the harbour. By 1692 the gap was bridged by a bar of sand. During the earthquake of that year a portion of the spit,  $\frac{1}{4}$  mile in length, suddenly subsided, so that only the chimneys or upper parts of houses that were not overthrown appeared above the water. The harbour of Port Royal also sank, so that the streets along the harbour-side afterwards lay at a depth of from 4 to 8 fathoms. Yet the depression of the ground itself at Port Royal and in other places was not supposed to exceed a foot. There can be no doubt from the evidence above described that the seismic focus was situated, in part at least, almost vertically below the haven between Kingston and Port Royal, though a portion of it may have extended as far as 3 miles to the south of the coast. It is also probable that the Port Royal and Kingston earthquakes originated, roughly, within the same focus.

The West Indian region is distinguished by those steep surface-gradients which characterize areas of great instability. Jamaica, in common with Porto Rico and the south of Hayti, lies along a crust-ridge, which towards the west is prolonged into the mountains of Honduras, while it is separated from a corresponding ridge, constituting the island of Cuba, by the submarine depression of the Bartlett deeps. To the east, the Jamaican and Cuban arcs unite in one main ridge which bends round to overlap the curved line followed by the volcanic islands of the Lesser Antilles. These form the north and east boundaries of the great deeps of the Caribbean Sea. On the south lie the mountain ranges of Venezuela, etc., which, as we know from the destructive earthquakes of Cumana in 1799 and 1853 and of Caracas in 1812, are still in the stage of vigorous growth. Towards the west, and connected with the West Indian series, are the Central American chains, also studded with volcanos, and in parts frequently visited by violent earthquakes. In this West Indian region, as elsewhere, it is not unlikely that the mountain arcs have a tendency to press forward on their outer and convex side, and to subside towards the interior of the arcs. The movements along the line of the Lesser Antilles certainly suggest a slipping westwards into the Caribbean deeps. In Jamaica, along the northern boundary of that sea, the movement may be more complex, the northern side of the Jamaican ridge having a tendency to move northwards and forwards towards the Bartlett deeps, while on the south there is a continued subsidence and slipping towards the Caribbean Sea. Of such intermittent slips, the Port Royal and Kingston earthquakes appear to be some of the latest manifestations.

So far as I am aware, there is no evidence of that intense crushing that was so conspicuous a feature of, say, the Japanese earthquake of 1891. Extension, rather than compression, was manifested in 1692, for at Port Royal one whole street, in which many houses were left standing, was said to have been doubled in width by the earthquake. There is much evidence to favour such a view in the case of the Kingston earthquake—the extremely local character of the destructive shock, the snapping of the cable to the south, and the minor character of the disturbances registered by distant seismographs.

\* A so-called 'tidal' wave was observed on the north side of the island. It is said that Annotto Bay was inundated and that houses were swept away. No time is mentioned, and, if the sea-waves were of seismic origin, we should expect to hear of similar reports from Port Antonio and other adjoining harbours.



## CANADIAN TRADE DELEGATION.

The following is a summary of the movements of the Canadian Delegates leaving Halifax per S.S. 'Olenda' on February 15, showing the dates of arrival at the several islands and the proposed public meetings, entertainments, etc. :—

## COMING SOUTH.

*St. Kitt's, Saturday, February 23.*—To be received by a committee consisting of President of the Agricultural and Commercial Society and some of the leading merchants. A meeting of the Society to be held in the afternoon. The Administrator to give dinner to Delegates and Committee. To receive, on arrival, copies of letters from the several islands concerning the receptions there.

*Antigua, Sunday, February 24.*—Reception Committee to receive them on board the S. S. 'Olenda.' Being Sunday no public meeting will be held. This is to be held when going back north.

*Barbados, Tuesday, February 26.*—The Committee of Commerce on the arrival of the S. S. 'Olenda' at St. Kitt's will cable the Delegates welcoming them to the West Indies. On their arrival at Barbados they will be received and informed of the arrangements proposed to be carried out on their return on March 8.

*Trinidad, Wednesday, February 27.*—A Reception Committee consisting of members of the Committee of the Chamber of Commerce and of the Agricultural Society to receive the Delegates on arrival. Arrange the subjects for discussion at the formal meeting to be held on their return on March 6. Make calls in town. Lunch with the Committee.

*British Guiana, Friday, March 1.*—A Reception Committee to meet the Delegates and discuss what is best to be done. A general meeting of the Royal Agricultural and Commercial Society together with the Chamber of Commerce to be held on Monday, March 4. Sail March 4.

## GOING NORTH.

*Arrive Trinidad, Wednesday a.m., March 6.*—Business meeting to be held on the 6th. in Council Chamber. Drives in the afternoon. Rooms for Delegates secured at Queen's Park Hotel as guests of the Reception Committee. On the 7th., special train to Caroni to see new sugar process, thence by carriage to Maracas Waterfall—picnic lunch. On the way cacao to be seen at its best. A dinner in the evening by the Chamber of Commerce and Agricultural Society. The Governor will be asked to preside. Leave Trinidad, Thursday p.m., 7th.

*Arrive Barbados, Friday, March 8.*—Arrangements to be made with the Delegates when on their way south.

*St. Lucia, Monday, March 11.*—A Committee of planters and merchants to welcome Delegates. A public meeting to be held; the Administrator to open the meeting. Products of the island produced in commercial quantities to be shown. If time allows, to visit Grand Cul-de-Sac Sugar and Rum Factory.

*Antigua, Wednesday, March 13.*—A public meeting to be held.

*St. Kitt's, Friday, March 15.*—If the public meeting is not held on February 23, it will be held on March 15 on arrival of the Delegates on their way north.

Similar arrangements are in contemplation at Dominica.

## WEST INDIAN SUGARS AND CANADIAN PREFERENCE.

In a letter to the Imperial Commissioner of Agriculture, dated Montreal, January 31, 1907, Mr. J. Russell Murray forwarded the following extract from a letter received by him from the Commissioner of Customs at Ottawa, relative to the status of raw sugars shipped to Canada from the British West Indies via New York, and to their participation in the benefits of the preferential tariff:—

I beg to say to you that shipments made as stated may be allowed entry under the provisions of the preferential tariff when consigned to a place in Canada from a country entitled to the provisions of the preferential tariff and the produce of such country, and provided that the goods shall not be entered for consumption or for warehouse in the United States, but shall only remain in that country for the purpose of their transshipment.

The bill of lading requires to show that the goods were consigned to a place in Canada *without contingency of diversion*.

## TRANSPORT OF PARA RUBBER SEEDS.

In reference to the note in the *Agricultural News* (Vol. VI, p. 23) on the transport of Para rubber seed, it is interesting to observe the results of importations into Jamaica, as recorded in the report on the Department of Public Gardens and Plantations, for 1905-6 :—

A consignment of 7,500 seeds, packed with incinerator earth and sawdust in biscuit tins, was forwarded from Singapore by parcel post on August 31, and arrived in Jamaica on October 25, 1905. Forty-five seeds were rotten when received; 7,455 seeds were sown, and of these 6,506 germinated, or 87 per cent. Of the 6,506 plants potted, 1,435 were constitutionally weak and died soon after potting. There were thus obtained 5,071 plants, or about 68 per cent. of the number of seeds sown.

On January 30, 1906, 725 seeds were received from Para. They were packed in powdered charcoal, and only fifteen were bad on arrival. From the 710 seeds sown, 656 plants were raised, or about 90 per cent.

It does not appear to make any difference what the packing material may be so long as it is dry. Sifted dry earth is perhaps the best material to recommend, as it is always possible to obtain it.

**Lagerstroemia indica.** In addition to the previous references to this plant in the *Agricultural News*, Vol. IV, pp. 317 and 364, it may be of interest to notice that it is one of the commonest flowering shrubs in the gardens of the Southern United States. It is there called the crape-myrtle, from its craped petals and myrtle-like leaves. There are three well-marked varieties which are said to come true from seed, viz., the common pink, the white, and the dark-red. It may readily be propagated by cuttings of the young wood. These take root more certainly if dipped first in Bordeaux mixture. Professor Massey, of North Carolina, mentions crossing the flowers of white and red and producing diversified offspring. The crape-myrtle becomes unsightly if its long branches are not cut back to about 6 inches after each flowering. Such pruning also induces more copious branching, and hence a greater quantity of flowers.



## MARKET REPORTS.

**London**,—January 29, 1907. 'THE WEST INDIA COMMITTEE CIRCULAR,' MESSRS. KEARTON, PIPER & Co.; MESSRS. E. A. DE PASS & Co., January 25, 1907; 'THE LIVERPOOL COTTON ASSOCIATION WEEKLY CIRCULAR,' January 25.

ARROWROOT—St. Vincent, 2 $\frac{3}{4}$ d. per lb.  
BALATA—Sheet, 1/7 to 2/-; block, 1/6 to 1/7 per lb.  
BEES'-WAX—£7 10s. to £8 per cwt.  
CACAO—Trinidad, 88/- to 96/- per cwt.; Grenada, 78/- to 84/- per cwt.  
COFFEE—Jamaica, good to fine ordinary, 40/- to 44/-; greenish to fine, 50/- to 123/- per cwt.  
COPRA—Trinidad, £25 10s.; East Indian, £26 12s. 6d. to £27 per ton.  
COTTON—medium fine, 6·85d.; West Indian Sea Island, good medium, 18 $\frac{1}{2}$ d.; medium fine, 19 $\frac{1}{2}$ d.; fine, 21d. Prices paid, 4d. to 24d. per lb.  
FRUIT—  
GRAPE FRUIT—6/- to 6/6 per box.  
BANANAS—Jamaica, 4/- to 6/- per bunch.  
ORANGES—Jamaica, 5/- to 7/- per box.  
PINE-APPLES—St. Michael's, 1/9 to 4/- each.  
FUSTIC—£4 5s. to £4 15s. per ton.  
GINGER—Jamaica, common, 58/- to 60/-; medium to fine, 62/- to 85/- per cwt.  
HONEY—17/- to 23/- per cwt.  
ISINGLASS—West Indian lump, 1/9 to 2/6; cake, 1/1 per lb.  
LIME JUICE—Raw, 11d. to 1/3 per gallon; concentrated, £21 12s. 6d. per cask of 108 gallons; distilled Oil, 2/6 to 2/7 per lb.; hand pressed, 3/4 per lb.  
LOGWOOD—£4 5s. to £4 15s.; roots, £3 5s. to £4 5s. per ton.  
MACE—Fair pale, 1/6 to 1/7; fair to pale red, 1/4 to 1/5 per lb.  
NUTMEGS—60's, 1/6; 66's, 1/-; 72's, 10d.; 83's, 9d.; 92's, 7d. per lb.  
PIMENTO—Fair, 2 $\frac{3}{4}$ d. per lb.  
RUM—Jamaica, 2/8; Demerara, 1/2 to 1/3 $\frac{1}{2}$  per proof gallon.  
SUGAR—Yellow crystals, 16/6 to 18/- per cwt.; Muscovado, 14/- to 15/- per cwt.; Molasses, 11/6 per cwt.

**Montreal**,—January 18, 1907.—Mr. J. RUSSELL MURRAY.  
(In bond quotations, c. & f.)

COCOA-NUTS—Jamaica, \$27·00; Trinidad, \$25·00 per M.  
COFFEE—Jamaica, medium, 10c. to 12c. per lb.  
GINGER—Jamaica, unbleached, 13c. to 14c. per lb.  
MOLASSES—Barbados, 27c. to 28c.; Antigua, 25c. to 26c. per Imperial gallon.  
NUTMEGS—Grenada, 110's, 15c. to 16c. per lb.  
PIMENTO—Jamaica, 5 $\frac{1}{4}$ c. to 5 $\frac{1}{2}$ c. per lb.  
SUGAR—Grey crystals, 96°, \$1·98 to \$2·05 per 100 lb.  
—Muscovados, 89°, \$1·40 to \$1·50 per 100 lb.  
—Barbados grocery, \$2·10 to \$2·25 per 100 lb.

**New York**,—January 25, 1907.—Messrs. GILLESPIE BROS. & Co.

CACAO—Caracas, 18c. to 19c.; Grenada, 17 $\frac{1}{2}$ c. to 18c.; Trinidad, 18c. to 19c.; Jamaica, 15c. to 16 $\frac{1}{2}$ c. per lb.  
COCOA-NUTS—Jamaica, \$23·00 to \$24·00; Trinidad, \$21·00 to \$22·00 per M.  
COFFEE—Jamaica ordinary, 7 $\frac{3}{4}$ c. to 8c.; good ordinary, 8 $\frac{1}{2}$ c. per lb.  
GINGER—Dark scraggy root, 10 $\frac{1}{2}$ c. to 11 $\frac{1}{4}$ c.; small to bright bold, 11 $\frac{1}{2}$ c. to 13c. per lb.  
GOAT SKINS—Jamaica, Antigua, and Barbados, 59c. to 61c.; St. Kitt's, St. Thomas, and St. Croix, dry flint, 59c. to 61c. per lb.  
GRAPE FRUIT—Jamaica, \$3·00 to \$4·00 per barrel; \$1·75 to \$2·50 per box.  
HONEY—Jamaica, 72c. per gallon.

LIMES—\$7·50 per barrel.  
MACE—35c. per lb.  
NUTMEGS—95's to 100's, 16c.; 100's to 110's, 13c.; 130's, 12c.  
ORANGES—Jamaica, \$3·50 to \$4·00 per barrel; \$1·50 to \$1·75 per box.  
PIMENTO—5 $\frac{3}{4}$ c. to 5 $\frac{1}{2}$ c. per lb.  
SUGAR—Centrifugals, 96°, 3·48c.; Muscovados, 89°, 2·98c.; Molasses, 89°, 2·73c. per lb. duty paid.

## INTER-COLONIAL MARKETS.

**Barbados**,—February 12, 1907.—Messrs. T. S. GARRAWAY & Co., and Messrs. JAMES A. LYNCH & Co.

ARROWROOT—St. Vincent, \$3·80 to \$4·75 per 100 lb.  
CACAO—Dominica, \$12·00 to \$15·00 per 100 lb.  
COCOA-NUTS—\$14·00 per M. for husked nuts.  
COFFEE—\$10·25 to \$10·50 per 100 lb.  
HAY—85c. to \$1·10 per 100 lb.  
MANURES—Nitrate of soda, \$65·00; Ohlendorff's dissolved guano, \$55·00; Cotton manure, \$42·00; Cacao manure, \$42·00 to \$45·00; Sulphate of ammonia, \$75·00; Sulphate of potash, \$67·00 per ton.  
ONIONS—Madeira, \$3·50 to \$3·75 per 100 lb.  
POTATOS, ENGLISH—Nova Scotia, \$2·20 to \$2·30 per 160 lb.  
RICE—Demerara, \$5·65 per bag (190 lb.); Patna, \$3·75; Rangoon, \$2·90 per 100 lb.  
SUGAR—\$2·60 per 100 lb.

**British Guiana**,—February 16, 1907.—Messrs. WIETING & RICHTER.

ARROWROOT—St. Vincent, no quotations.  
BALATA—Venezuela block, 25c.; Demerara sheet, 38c. per lb.  
CACAO—Native, 15c. to 16c. per lb.  
CASSAVA—\$1·08 per barrel.  
CASSAVA STARCH—\$6·00 per barrel.  
COCOA-NUTS—\$10·00 to \$12·00 per M.  
COFFEE—Creole, 14c. to 15c. per lb.  
DHAL—\$4·30 to \$4·35 per bag of 168 lb.  
EDDOS—\$1·44 per barrel.  
MOLASSES—16 $\frac{1}{2}$ c. per gallon.  
ONIONS—Madeira, 4c. to 4 $\frac{1}{2}$ c. per lb.  
PLANTAINS—40c. to 48c. per bunch.  
POTATOS, ENGLISH—Nova Scotia, \$2·55 to \$3·25 per barrel.  
POTATOS, SWEET—Barbados, \$1·44 per bag.  
RICE—Ballam, \$5·90 to \$6 per 177 lb.; Creole, \$4·75 to \$4·80 per bag (ex store).  
SPLIT PEAS—\$6·00 to \$6·10 per bag (210 lb.).  
TANNIAS—\$1·68 per barrel.  
YAMS—White, \$2·04; Buck, \$2·40 per bag.  
SUGAR—Dark crystals, \$2·00 to \$2·10; Yellow, \$2·50 to \$2·60; White, \$3·50 to \$3·60; Molasses, \$1·40 to \$1·75 per 100 lb. (retail).  
TIMBER—Greenheart, 32c. to 55c. per cubic foot.  
WALLABA SHINGLES—\$3·00, \$3·75, and \$5·25 per M.

**Trinidad**,—February 16, 1907.—Messrs. GORDON, GRANT & Co.

CACAO—Ordinary to good red, \$18·00 to \$18·25; estates, \$18·50 to \$18·75 per fanega (110 lb.); Venezuelan, \$18·60 to \$19·00.  
COCOA-NUTS—\$21·00 per M., f.o.b.  
COCOA-NUT OIL—90c. per Imperial gallon (cask included).  
COPRA—\$4·50 to \$4·75 per 100 lb.  
DHAL—\$4·35 to \$4·40 per 2-bushel bag.  
ONIONS—\$3·00 to \$4·00 per 100 lb. (retail).  
POTATOS, ENGLISH—\$1·00 to \$1·60 per 100 lb.  
RICE—Yellow, \$5·40 to \$5·60; White, \$5·75 to \$6·00 per bag.  
SPLIT PEAS—\$5·50 to \$5·60 per bag.  
SUGAR—Yellow crystals, \$2·25 to \$2·50; molasses, \$2·00 to \$2·25 per 100 lb.  
SULPHATE OF AMMONIA—£11 15s. per ton.





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## Forestry in the West Indies.

THE tropical forests of the West Indies contain many trees which produce valuable timbers, some few of which are already familiar to commerce; but many of them have not yet become known in the northern markets. Mr. Herbert Stone, F.L.S., in *The Timbers of Commerce*, described

about forty species from the West Indies which commended themselves to him as timbers of good quality, likely to be heard of in the future. Mr. W. Harris, F.L.S., the Superintendent of Hope Gardens, Jamaica, has enumerated, in a paper prepared for the recent West Indian Agricultural Conference, more than a hundred species of Jamaica trees which could supply woods useful for building houses and other purposes for which timber is required. Yet few of the West Indian woods, other than mahogany, cedar, fustic, and logwood, are of much commercial importance in Europe or America.

No large logging industry such as exists in Norway, Canada, and the United States seems practicable in the West Indies. For one thing there is the question of transport. The cost of hauling timber from the forests to the coast is likely to be prohibitive, and it is not possible to use river transport because many of the West Indian timbers are heavy and do not float readily. Perhaps a greater obstacle is to be found in the fact that forests are not, with one or two possible exceptions, to be found in the West Indies consisting almost entirely of one or two useful species, such as exist in the above-mentioned countries. As a rule, the individuals of any one useful species generally exist in an isolated state, closely surrounded by single trees of many other species, perhaps more or less useless.

Such conditions must stand in the way of a steady supply of any particular timber, without which it is almost impossible to establish a market. This difficulty in finding a market for a new kind of wood is referred to by Mr. Stone, who says, in a report on colonial timbers to the Imperial Institute, that the bulk of the



British timber trade is limited to a few kinds, which every manufacturer keeps in stock. It is more to the interest of the trader to limit his purchases to a few kinds of wood which he can stock largely, and thus buy to better advantage, than to use a large number of woods which must be purchased in small lots. Hence, fresh arrivals will stand little chance of obtaining a footing unless they show peculiar merits. Any timbers which resemble in some way the staple timbers, and will pass under the same names, will be readily bought on trial and, if useful, probably adopted. Thus, various similar looking woods are sold as cedars, mahoganies, or ebonies, and their sole claim to their trade names is often their resemblance in colour and grain to better-known woods.

It does not seem probable that, in the near future at any rate, there will be extensive planting in the West Indies of timber woods, in uniform groves of one or two species; for the harder and heavier woods are usually of very slow growth, and the lighter and quicker-growing timbers could probably not be grown as cheaply as pine and spruce lumber can be imported from the forests of North America. Any tree planting that might be done would probably be more remunerative, in the present state of affairs, if it were confined to trees which yield valuable products, such as rubber, logwood, balata, and fustic.

Experience has shown that where, for one reason or other, clearings have been made in the forests in these islands, the process of natural afforestation with valuable timbers is very slow, and recourse must be had to planting. Perhaps in the future, when the American forests of conifers have been depleted and the cost of American lumber has risen to a prohibitive point, plantations may be made in the West Indies of various soft-wooded dicotyledonous and coniferous tropical trees.

A brief review of the position of affairs as regards forestry in the West Indies, taken from Dr. Schlich's *Manual of Forestry*, was published in the *West Indian Bulletin* (Vol. VII, no. 3). From this it appears that in Jamaica, although there are many useful woods, the most important are cedar, mahogany, logwood, and fustic. Very little of the first two is now exported, though the value of the exports of dyewoods and logwood extract for the last ten years has averaged £169,149. Prominence is given elsewhere in these columns to a plea for the use of native woods in the re-construction of the city of Kingston. In Trinidad, also, there are many valuable woods, but the

export is practically confined to cedar, which is sent to Germany for use in the manufacture of cigar boxes. Formerly, mora seems also to have been exported. The output of timber from Trinidad has shown considerable fluctuations; last year the value of the exports reached £14,453. The chief forest product of British Guiana is balata, the export of which amounted in 1905-6 to 517,335 lb., valued at \$181,848. Greenheart and mora timbers were exported to the value of \$114,704. The other forest products exported consisted of ordinary lumber, firewood, shingles, hardwood posts, sleepers, etc. 'By far the greater part of the country is covered with forest containing mostly hardwoods.'

In Trinidad, where the forests are in charge of an Indian forest officer, the Government has realized the necessity of having a forest policy. As stated by this officer (Mr. C. F. Rogers), 'this policy' includes the reservation of certain areas of land from sale, and their management as forests for the protection of the climate, the regulation of the water supply in the rivers, the prevention of landslips and floods, and the production of timber and other forest produce.'

An excellent move has recently been made in Grenada, as mentioned in the *Agricultural News*, Vol. V, p. 255, in the constitution of a Forestry Board, which, in addition to exercising functions in regard to the conservation of forests, will also endeavour to disseminate sound instruction amongst planters, cultivators, and other inhabitants of the colony concerning forestry. This appears to be an example that might with advantage be followed in some other West Indian Colonies.

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## JAMAICA EARTHQUAKE.

In reply to a resolution unanimously adopted by the representatives of the West Indian Agricultural Conference at a meeting held on board the S.S. 'Port Kingston,' on Monday, January 21, 1907, the following letter has been received:—

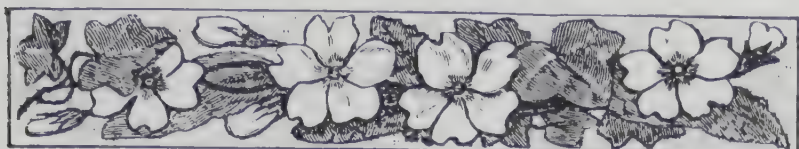
*Colonial Secretary, Jamaica—to the President of the West Indian Agricultural Conference.*

Jamaica,  
February 14, 1907.

Sir,—I am directed to acknowledge the receipt of your letter, dated the 21st. ultimo, and, on behalf of the sufferers by the recent earthquake, to thank the representatives of the West Indian Agricultural Conference for their kind expression of sympathy.

I have, etc.,  
(Sgd.) H. CLARENCE BOURNE,  
Colonial Secretary.





## SUGAR INDUSTRY.

### The Vere Central Factory, Jamaica.

The *International Sugar Journal*, for February, contains the following description of the Vere Central Factory in Jamaica:—

The Vere Estates Company, Ltd., Jamaica, will deal with the crops of at least five sugar estates. With the exception of the railways and rolling stock, the whole of the contract has been let through Messrs. E. A. de Pass & Co., of London, to the Harvey Engineering Company, Ltd., of Glasgow. The buildings, which are entirely of iron, have been made by Messrs. A. and J. Main & Co., Ltd., of Glasgow. The machinery will be of the most up-to-date description, as is to be expected from a firm of the standing of the Harvey Engineering Company, Ltd.

The *modus operandi* is proposed to be as follows:—

The canes, after being cut, will be collected in the fields by means of trucks run on portable rails, which, when full, will be drawn by locomotives alongside the cane carriers at the mill. The canes will be tipped on to these by a special apparatus, and will then be carried along to the Krajewski crushers, and thence to the six-roller mill. It may be observed that both crushers and six-roller mill will be driven by the same engine through suitable gearing. The megass is run off on carriers to the Babcock and Wilcox water-tube boilers, which are naturally fitted with suitable furnaces for burning the green megass. The juice passes through a mechanical strainer and is then treated according to the kind of sugar desired. After the subsidisers and eliminators comes the triple effect, one of Harvey's well-known design. From these the juice goes to the syrup eliminators and then to the vacuum pan supply tanks. Two vacuum pans are provided, and both pans and triple effects are connected up with one central barometrical condenser, fitted with one of the most improved types of dry-air pumps. The massecuite is discharged into a range of crystallizers, and from these goes on to the water-driven centrifugals, whence, after curing, the finished product is mechanically conveyed to the sugar stores.

The Vere estate is noted for the fertility of its soils, and as steam ploughing is about to be introduced, the result of the company's operations is likely to be of no small moment in the industrial life of Jamaica; but it is hoped that the disastrous earthquake which has just destroyed Kingston will not have done any material harm to this new venture.

### Sugar Factories in Cuba.

The *Scientific American*, for November 3, 1906, contains an illustrated article on this subject. The following particulars may be of interest:—

There are 179 sugar plantations in Cuba, eighty-three of which have an annual production of more than 7,000 tons of sugar. The largest factory is at Nipe Bay; when in full operation it will have a grinding capacity of 5,000 tons of cane every twenty-four hours. There will be 30,000 acres at least in cane. The annual output is estimated at 80,000 tons of sugar. Engines of 9,000 horse-power are set up, and 15 miles of railway are being constructed on which 175 cane cars and seven locomotives will carry the canes to the mill. There are in Cuba two factories which produce more than 25,000 tons of sugar a year, six ranging between 20,000 and

25,000, and seventeen between 15,000 and 20,000 tons.

The cane fields are ratooned for about ten years before replanting. Ten tons of cane produce 1 ton of sugar if treated by the latest mechanical processes. The climate permits cutting and grinding of cane for a period ranging from 150 to 200 days. At the larger factories, centrifugal sugar of 96° polarization costs less than 1½c. per lb. to produce, all expenses included.

The following is the procedure at the large factories:—

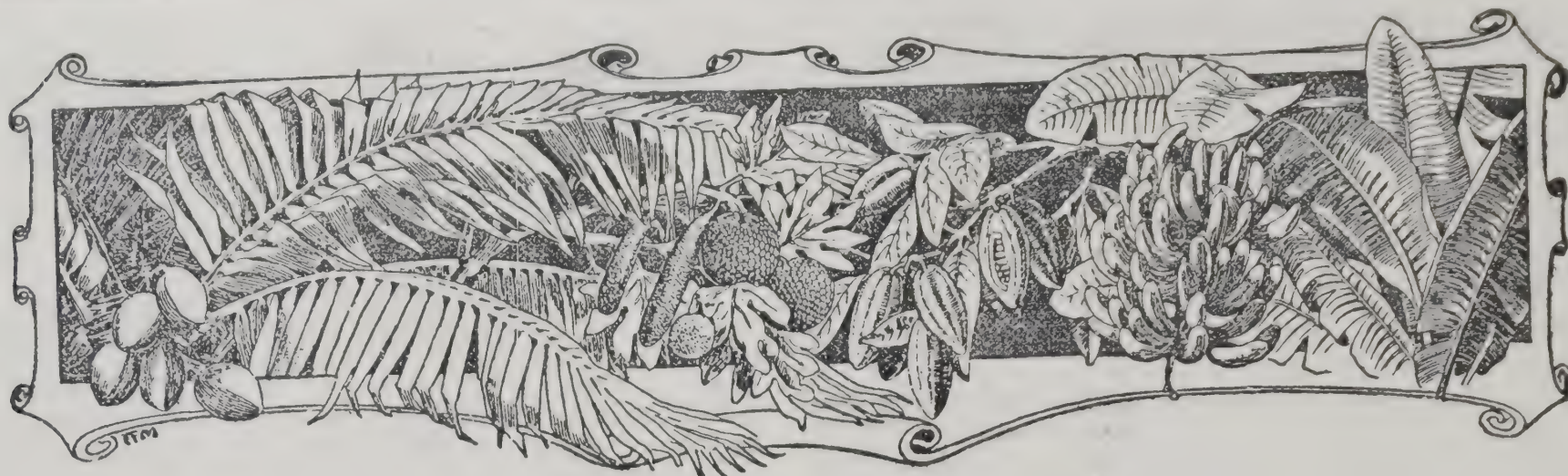
The cut canes are loaded directly on the plantation cars and drawn in trains to the factory. A hoisting machine raises each car-load in turn by sling chains, and carries it by a trolley on an aerial way to the receiving hopper, where it is automatically set free. Only three minutes are required to sling, raise, and discharge a load of 6 tons of cane. The canes are arranged in the truck so as to enter the receiving hopper endways. They pass continuously to the rollers of the mill, directly or along an endless conveyer. There are usually eight rollers, the first being corrugated, and each being 6 or 7 feet long, and 40 inches in diameter; they express 75 per cent. of the cane. The megass passes at once by an endless conveyer to the improved furnaces which burn it without any previous drying. The juice is pumped into a heater where its temperature is raised, by the utilization of waste heat, to about 112° F. It then passes into the steam-jacketed defecators which usually have a capacity of over 1,000 gallons each. When the temperature has reached 190° F., 7 lb. to 15 lb. of the best lime are added for every thousand gallons. After about half an hour, the sediment on the bottom, the purified juice, and the scum on the top are removed successively by a special tap into different receptacles. The scum and sediment contain juice which is extracted by defecation and the filter-press. The purified juice is delivered by a pump from the defecators into the triple or multiple effect vessels. A vacuum is formed in these by a condenser and air-pump. Exhaust steam from the engines and pumps passes to the first vessel and causes the juice to boil. The hot vapours from the first vessel pass around the second and cause it to boil, and the third is heated in the same way. The syrup may then be clarified by lime, and skimmed. It is then run into the vacuum pan where it is concentrated in vacuo, and crystallized by the addition of cooler syrup. The massecuite produced consists of 75 to 87 per cent. of sugar (sucrose), 5 to 15 per cent. of other solids, and 8 to 10 per cent. of water. The massecuite is broken up when hot by a 'mixer,' or when cold by a 'triturator' machine, and freed from molasses in a centrifugal making 1,000 or 1,500 revolutions per minute. The sugar which remains is of 96° polarization; it may be 65 per cent. of the massecuite. The molasses are treated in a vacuum pan and the second sugar of 85° to 90° polarization is produced. The molasses left are usually made into rum. The second sugar may be 9 per cent. and the molasses 26 per cent. of the massecuite. The whole operation is under constant chemical control.

### BARBADOS MUTTON.

A proprietor of a sugar estate in Barbados writes as follows to a friend in regard to the mutton obtained from the woolless sheep reared on pastures on the windward side of the island, that is, those exposed to the influence of the sea air:—

You once gave me a mutton chop for luncheon at your house which I thought was the best bit of mutton I ever tasted; since that I drove about and bought sheep which I keep at——, only on the seaside, and I must say nothing could be better than their mutton, and I have to thank you for that chop.





## WEST INDIAN FRUIT.

### WEST INDIAN FRUITS IN CANADA.

The following is extracted from an article written by a Canadian correspondent to the *Demerara Daily Chronicle* (January 4, 1907). The writer discusses the effect of the new Canadian tariff on the West Indian fruit trade:—

The matter to which it is desired to draw notice is the possibility of the immediate diversion of an important portion of the British West Indian fruit trade from the United States to Canada as the result of placing limes and oranges on the free list, and also the encouragement which the Dominion Government have thus afforded for the expansion of the fruit-growing industry in the colonies to the south.

The total imports of oranges and limes during the period covered by the trade returns for the fiscal year that concluded on June 30 last were valued at \$1,635,249, of which the British West Indian contribution amounted to \$54,816, duty to the extent of \$187,807 being paid on the whole. By the placing of these items named on the free list, a loss of revenue to the extent of \$190,000 has been estimated by the Minister of Finance, but under the circumstances, it may be reasonably concluded that there will be an increase in the volume of trade which will justify the action taken.

Throughout the West India Islands, notably Jamaica, Dominica, St. Vincent, and St. Lucia, the development of the fruit industry to replace the crippled business of cane-sugar production has been occupying attention for some years. In Jamaica, the tendency has largely been in favour of bananas, the markets of New York and, to a lesser extent, of Great Britain readily absorbing the crops. In Dominica and St. Lucia, the attention of planters has been occupied by the cultivation of limes and oranges, which, although requiring a longer period to come to maturity, have the advantage that, once being established, they require little attention compared with bananas. Dominica has, by this means, arisen from the slough of depression, into which it was plunged by the great sugar failure, to comparative prosperity, and this year its exports will, for the first time since the collapse of sugar, top \$500,000. These exports at present, in a very large proportion, go to the United States. With the choice of two markets, however, to one of which he obtains free entry, the producer's natural inclination will now be towards Canada; for up to the present there has been no great demand for fresh limes in the United Kingdom. The advantage to the producer is obvious, and with thousands of acres of suitable land available in the West Indies and British Guiana, there can be little doubt that a great impetus will be given to lime and orange growing in those countries.

Not only will the action of the Government tend to assist to restore prosperity to their neighbouring colonies, but it will be the means of placing quantities of fresh health-giving fruits within reach of the people of Canada.

Another important aspect of the industry concerns the manufacturer of citric acid, an article of commerce which has increased enormously in value of late years. As a matter of fact, owing to the large increase in the demand for citric acid and the shortage of the supply of limes, that commodity has practically doubled in value in the course of a year. It is an article which is largely used in many processes of manufacture, particularly of mineral waters in Canada, and therefore, by the encouragement of the importation of limes through the establishment of a free market, the Dominion Government will also open a gate which will undoubtedly result in benefit to Canadian trade outside that in fresh fruit.

### ORGANIC NITROGENOUS FERTILIZERS.

The following is abstracted from the Cantor Lectures, delivered recently by Mr. A. D. Hall, M.A., Director of the Rothamsted Experimental Station, before the Society of Arts:—

Organic fertilizers are more slow in their action and less available to the plant than sulphate of ammonia or nitrate of soda. The rapidity of their action depends both on their composition and their mechanical condition, especially the fineness of their division. Peruvian guano and dried blood would come at one end of the scale; materials like ground hoofs and horns or leather at the other. The more slow-acting a nitrogenous manure is the greater is the proportion that will be wasted, inasmuch as it will escape recovery, not only in the crop to which it is applied, but in all succeeding ones. At Rothamsted, not more than 26 per cent. of the farmyard manure applied to wheat and 31 per cent. of that applied to mangels during the last fifty years have been recovered in the crop. Other experiments show that after forty years some of the nitrogen applied as farmyard manure is still coming out in the crop. The Rothamsted experiments upon barley and mangels, however, show that rape dust is almost as active a source of nitrogen as sulphate of ammonia. But these organic manures are, on the whole, slower in their action and less perfectly recovered in the crop than sulphate of ammonia. Also, the unit of nitrogen (with few exceptions) costs more in the former. The farmer has a strong opinion in favour of organic forms of nitrogen. The chief reason for this is the improvement brought about in the condition of the soil by organic manures.



## SCIENCE NOTES.

## Cashew.

The cashew tree (*Anacardium occidentale*) is a near relative of the mango. Its name is probably a corruption of the French *acajou*. It appears to be native to the West Indies and Brazil and has been introduced into the East Indies and other tropical countries.

The cashew forms a spreading tree, 20 to 40 feet high, with large, leathery, light-green leaves, and panicles of rather small, red-tinted, polygamous flowers at the ends of the young branches, each panicle producing usually a single nut at the end of a pear-shaped red and yellow juicy stalk, 2 to 4 inches long. As in the mango, only one (or sometimes more) of the stamens may be functional.



FIG. 3. THE CASHEW.

(From *The Book of Trinidad*.)

The wood of this tree is hard and strong and is used for making farm implements and boat building and also for charcoal. A clear reddish gum exudes in quantities from wounds, and forms an excellent substitute for gum arabic. This gum is largely used by bookbinders in South America, from which country it is occasionally exported to England. A varnish of the gum is said to protect book-covers and woodwork from termites and other insects. The sap of the tree has been employed as a marking ink on linen, and the bark may be used for tanning.

The so-called 'fruit' of the cashew (the swollen pedicel) is rather membranous than pulpy, and is full of a sweetish though very astringent juice. It assuages thirst remarkably well. A distilled liquor and a vinegar have been made from this juice. The fruit is also stewed or preserved with sugar.

The nuts are kidney-shaped and about an inch long. The appearance of the 'fruits' and nuts is well shown in fig. 3.

An inner layer of the shell of the nut contains a thick

fluid which turns black in the air. This fluid contains a poisonous, volatile, acrid oil, which readily blisters the skin and prevents access to the edible seed inside. When the nuts are roasted, this oil is driven off in vapour, and the nuts can be shelled. The roasted seeds are of excellent flavour and are said to be superior in taste to those of all other nuts. They yield about 40 per cent. of a good oil equal to almond oil. There seems no doubt that, if a sufficient number of trees were planted, there would be a ready market in the temperate regions for large quantities of cashew gum and cashew nuts.

The editor of the *Agricultural Bulletin of the Straits and Federated Malay States* mentioned last October that he had received a letter and samples of the seed of the cashew nut from Mr. Guiot, Aix en Provence, France, who would be glad to buy these nuts in large quantities. Mr. Guiot would take at once as much as 22,000 lb. and considered that the demand would rapidly increase. The best time for them to reach Marseilles is in the months of September or October.

## West Indian Mangroves.

There are three trees in the West Indies which are called mangroves, growing in swamps, and having bark which can be used for tanning:—

The true mangrove (*Rhizophora Mangle*) belongs to the order *Rhizophoraceae*, has aerial roots from the branches, and its seeds germinate within the fruit, emitting a long hypocotyledon. The wood is white but turns red when soaked in water and is used in boat building.

*Laguncularia racemosa*, called in Porto Rico the white mangrove, and in Cuba the red mangrove, belongs to the same order as the West Indian almond (*Terminalia Catappa*). According to a communication from Cuba in *L'Agriculture pratique des pays chauds*, for last December, nearly 5,000 tons of the bark and leaves of this plant were exported from Havana in 1905. An analysis of the bark gave 24.08 per cent. of tannin. It is very abundant in swamps.

*Avicennia nitida*, the black or white mangrove of Cuba and Porto Rico, belongs to the order *Verbenaceae*. The embryo germinates inside the fruit, but the hypocotyledon does not extend outside, as in the true mangrove. It has dark-coloured bark.

In Jamaica these three species are called the red, white, and black mangrove, respectively.

## PRESERVING FRUIT.

The following directions for preserving fruit without sugar are given in the *Journal of the Department of Agriculture*, Victoria, Australia:—

(1) Obtain bottles of well-tempered glass, each closed airtight by a stopper, which is screwed down on a ring of good-quality rubber.

(2) Remove stones or seeds, peel fruit if required, and fill the bottles with raw fruit.

(3) Fill up the bottles to the top with water.

(4) Put the unstoppered bottles in a boiler on a board or cloth; fill the boiler with water to the necks of the bottles, and boil the water until the fruit is cooked.

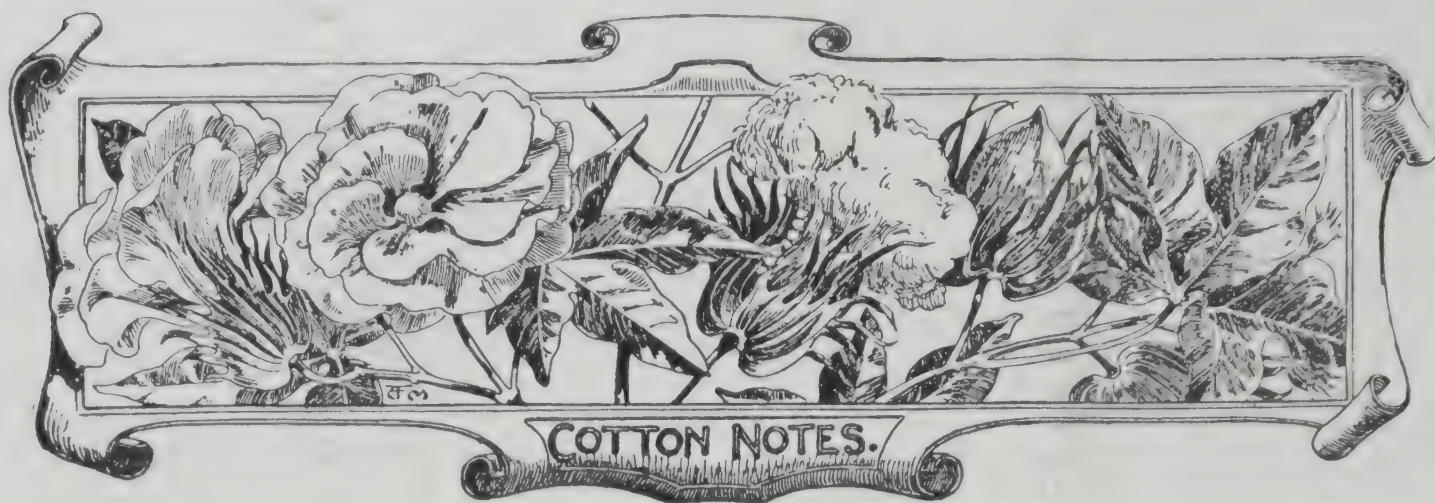
(5) Sterilize the covers and rubbers with hot water.

(6) Fill up the bottles with boiling water.

(7) Fit and screw down the stoppers while the bottles are still in the hot water, which must in no case be allowed to cool below 180° F.

(8) Let the bottles cool in the bath or cover them with a cloth while cooling.





### WEST INDIAN COTTON.

Messrs. Wolstenholme & Holland, of Liverpool, write as follows, under date of February 11, 1907, in regard to West Indian Sea Island cotton:—

Since our last report, West Indian Sea Island cotton has been in good request, but the arrivals have been very limited.

The American planters are still holding the majority of their stock of 'crop lots' for 25*d.*, but occasional lots are sold at a decline of 2½*d.* per lb. from asking prices.

Present extreme prices are likely to curtail the consumption very materially.

### CULTIVATING COTTON FIELDS.

Frequent references have been made in the *Agricultural News* to the advisability of cultivating the cotton fields during the dry season. It is well known that the surface soil becomes dry and caked and the soil cracks to a great depth during this season, resulting in the loss of large quantities of moisture from a soil that can ill spare it.

The cane holes, which are always made in the Barbados fields, make it impossible to cultivate the soil with any of the modern cultivators. One of the principal cotton planters in this island has now commenced to break the surface soil with ordinary garden rakes, and conserve the moisture by means of a fine surface tilth. These rakes are light, and can be easily handled by the children. The teeth of the rakes are only 2½ inches long and can be used to break up the surface soil without any fear of the roots of the cotton plants being damaged.

The cost of doing the work varies from 12*c.* to 16*c.* per acre, and the manager is very pleased with the way the work is done and with the results as affecting the cotton plants.

### COTTON IN ST. KITT'S-NEVIS.

Mr. F. R. Shepherd, Agricultural Superintendent, has forwarded the following note on cotton prospects in St. Kitt's-Nevis:—

The picking of cotton is now almost over in St. Kitt's, and on the estates the plants are being turned in and the land planted in canes.

The yield has not, on the whole, been equal to last season, as the very high winds affected the plants in the northern parts of the island and caused a great loss in the bolls; but I am of opinion that the general yield will be not much below the average, and with the good prices that are being obtained the results will be very satisfactory.

The prices that have been so far heard of are from 2*s.* to 2*s.* 2*d.* per lb., and these were for the first lots of cotton sent on from the first pickings.

From the generally good results obtained it is likely that a much larger area will be put in cotton this season, and there is a tendency to plant earlier so as not to interfere with the planting of cane on the same land.

I regret to say that the prospects are not encouraging this season in Nevis. Fields that seemed most promising on my last visit, late in December, have yielded a very small return of cotton, and in some places where the plants are well grown there are few bolls to be seen.

It appears that, in consequence of the abnormally high winds and very cold weather experienced in the month of January, the plants shed their bolls, as I could see no other reason, such as the presence of any disease.

In a few places, where the cotton was later, the plants show signs of new life and are flowering well, and it is reasonable to expect some return from these; but, taking the whole island, the crop will be a very short one for the acreage planted.

### ST. VINCENT COTTON INDUSTRY.

The Agricultural Superintendent at St. Vincent reports as follows on the prospects of the cotton industry:—

The total amount of lint of first-quality Sea Island cotton ginned to date (February 23) at the Central Cotton Factory is 154,955 lb., equal to over 430 bales.

It now seems quite possible that well over 500 bales of this quality will be produced in the island, and probably about 100 bales of other qualities. It is, of course, difficult to estimate the crop, as we are getting second pickings in places, and cannot yet tell how they will turn out.

Writing later (February 28), Mr. Sands gives the following information, received from England by the last mail, as to the results of the first two shipments of St. Vincent cotton. The growers are to be congratulated upon the high prices obtained for their cotton:—

For the 201 bales sold, the prices obtained have ranged from 26*d.* to 30*d.* per lb., the larger proportion realizing 28*d.*; 27 bales sold at the highest figure, viz., 30*d.* These were produced at Peter's Hope and Calder estates, with the exception of 2 bales from Evesham.

The high prices obtained, combined with the excellent reports on the quality and preparation of the lint, are, as you can imagine, most gratifying to all growers here.

I should mention that it is hoped to complete the ginning of 500 bales of first-quality cotton early next week. No cotton of other qualities has yet been dealt with.



## AGRICULTURAL EDUCATION AT BARBADOS.

The following reference to agricultural education at Barbados was made by his Lordship the Bishop in his address to the Synod on February 27:—

Sir Daniel Morris deserves the thanks of the colony for what he has done and tried to do for the benefit of agricultural science—providing and paying for science lecturers, and for exhibitions to scholars at Harrison College, lectures to teachers of elementary schools, grants of books, tools, seeds, flower-pots, boxes in which children can cultivate plants at home, and the agricultural shows in different parts of the country, at which provision is made for children's exhibits. There is a difference in the tone of the schools, and children appear to take interest in the things connected with agriculture. Last year at the Agricultural Show no less than fifty-two prizes were won by the children.

Out of the 166 schools we have in the colony, forty-four were presented for examination in agriculture, and eighteen schools had garden plots in cultivation. This result may not appear very satisfactory to some, but there are many circumstances to be taken into consideration.

First, the parents are, for the most part, apparently indifferent, and in some cases objection has been made against letting their children work at garden plots for which they were not paid.

Next, every foot of land in Barbados is of value, and eagerly sought after, and it has not been possible, except in very few cases, to obtain land near a school for garden cultivation. Again, it does not pay the teacher to take either drawing or agriculture as extras. Of late, great emulation has existed among the teachers as to which should stand first in the percentages of passes, and it does not pay so well to take any extras as to devote all attention to the 'three R's.' And last, our grant is small, and it is inelastic.

Employers of labour must prefer a workman who intelligently goes about his work to one who only acts by rule of thumb. Intelligence, if rightly directed, is always to be preferred to ignorance, and I mention it to you because everything that touches the welfare of the children in your cure, is part of your pledged and bounden duty and care, and because I feel sure that you will use all your influence with the parents to ensure regularity in the attendance and to secure for the child every educational advantage possible.

## UNDEVELOPED FRUITS OF THE CACAO.

Several cacao planters in the West Indies have been struck with the large number of fruits of the cacao tree that never reach maturity, and are asking whether this is due to a diseased condition of the trees.

This non-maturing of cacao fruits is a source of great loss to the total crop and would appear to be mainly a physiological trouble, due, probably, to an interference with the supply of nutrient materials at a critical period in the life of the younger 'forms.' It is not peculiar to the West Indies, for Mr. Herbert Wright, F.L.S., Controller of the Government Experiment Station, Ceylon, in an article on the 'Periodicity of the Cacao Tree,' in the *Tropical Agriculturist* for December 1906, writes as follows:—

The total number of flowers produced on a cacao estate may be from 1,700,000 to 3,606,000 per acre per year (300 trees to the acre). A yield of 3 cwt. of cured cacao per acre means that at the most only about 8,000 flowers developed into mature fruits on each acre per year; or, in other words,

a balance of 1,692,000 to nearly 3,600,000 flowers per acre per year are at present of no value to the average cacao planter. A large number of flowers appear to have been fertilized, but the expanding fruits soon turn yellow and shrivel; for the year 1903, out of a total of 569,738 promising fruits, no less than 288,205 were of this class. These facts show that there is ample opportunity for research in connexion with flower pollination and fertilization. The cacao trees on which these observations were carried out were normal; it would have been possible to select much more vigorous plants, and to show that the average number of flowers produced was in excess of those under observation for that year.

## JAMAICA TIMBERS.

Mr. W. Harris, F.L.S., writes to the *Jamaica Daily Telegraph* suggesting the use of local timber supplies in the rebuilding of Kingston. He says:—

In the central and western parishes there is an abundant supply of timbers suitable for building and other purposes. It is true that the trees are still standing, but building operations will continue on an extensive scale for three or four years at least, and, moreover, ripe hardwood and other suitable timbers grown on the limestone would require little or no seasoning, and scantling, boards, and shingles from such timbers are immensely superior in lasting qualities to the supplies usually imported. The Cockpit Country contains a very large supply of good, useful timber for all purposes, much, it is true, in rather inaccessible places; but if the matter were taken in hand systematically and energetically, immense quantities might be got to the railway or to the coast at prices which would leave a fair margin for profit.

Mr. Harris gives a list of timbers suitable for different purposes:—

### FOR HOUSEWORK.

Bread-nut, *Brosimum Alicastrum*.  
Broad-leaf, *Terminalia latifolia*.  
Cedar, *Cedrela odorata*.  
Juniper cedar, *Juniperus barbadensis*.  
Fiddle wood, *Petitia domingensis*.  
Mountain mahoe, *Hibiscus elatus*.  
Mahogany, *Swietenia Mahagoni*.  
Mosquito wood, *Mosquitoxylum jamaicense*.  
Naseberry or sapodilla, *Achras Sapota*.  
Bullet tree, *Minusops Sideroxylon*.  
Nickel or bead tree, *Ormosia monosperma*.  
Prickly yellow, *Tagara martinicensis*.  
Red or cherry bully tree, *Dipholis nigra*.  
Rose wood, *Amyris balsamifera*.  
Santa Maria or galba, *Calophyllum Calaba*.  
Shad-bark, *Pithecolobium alexandri*.  
St. Ann's yacca, *Podocarpus Purdieana*.  
Timber sweet-wood, *Nectandra exaltata*.  
Wild tamarind, *Pithecolobium arboreum*.  
Yoke wood, *Catalpa longissima*.

### FOR SHINGLES.

Broad-leaf, cedar, hog-gum (*Symphonia globulifera*), mountain bully tree, red or cherry bully tree, Santa Maria, timber sweet-wood, yellow sweet-wood (*Nectandra antillana*), yellow sanders (*Terminalia capitata*), etc.

### FOR WHARF PILES, ETC.

Bastard cabbage bark or angelin (*Andira inermis*), blind eye or yucco (*Sapium cuneatum*), button wood (*Conocarpus erecta*), cocoa-nut (*Cocos nucifera*), dogwood (*Piscidia Erythrina*), fiddle wood, nickel or bead tree, prune (*Prunus occidentalis*), mangrove (*Rhizophora Mangle*), white wood (*Tecoma leucoxylon*), etc.



## EDITORIAL NOTICES.

Letters and matter for publication, as well as all specimens for naming, should be addressed to the Commissioner, Imperial Department of Agriculture, Barbados.

All applications for copies of the 'Agricultural News' should be addressed to the Agents, and not to the Department.

*Local Agents:* Messrs. Bowen & Sons, Bridgetown, Barbados. *London Agents:* Messrs. Dulau & Co., 37, Soho Square, W., and The West India Committee, 15, Seething Lane, E.C. A complete list of Agents will be found on page 3 of the cover.

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# Agricultural News

VOL. VI. SATURDAY, MARCH 9, 1907. No. 127.

## NOTES AND COMMENTS.

### Contents of Present Issue.

The editorial deals with the subject of Forestry in the West Indies.

The new central sugar factory in course of erection in Vere, Jamaica, is described on p. 67; on the same page is a note on central factories in Cuba.

It would appear that the prospects of establishing a fruit trade with Canada are more promising under the new tariff (p. 68).

On p. 69 there appears an illustrated article on the cashew.

Recent reports as to the prospects of the cotton crop at St. Vincent and St. Kitt's are encouraging (p. 70).

A summary of a recent report by the Mycologist on cocoa-nut diseases in Trinidad is published on p. 75.

Interest attaches at the present time to the description of the methods adopted in Uganda for tapping *Funtumia* rubber trees (p. 77).

Useful information is contained in the article by Professor Milne on 'Construction in Earthquake Countries' (p. 78).

The attention of sugar planters is directed to the further note on the shipment of West Indian sugar to Canada via New York (p. 79).

### Inspection of Imported Plants.

The note on sugar-cane pests in Hawaii (p. 74) indicates some of the dangers likely to be incurred in importing canes for planting. Consignments of cuttings from Australia, Fiji, Queensland, and the Philippines were all found to be infested with insect pests, two of them so badly that they had to be burned; the other two were fumigated.

These are striking examples of what may happen when canes are imported, as it can easily be imagined what serious consequences might have resulted if these cane plants had been planted without inspection.

### Brazilian Linen Plant.

The following is taken from a report of the British Consul-General at Rio de Janeiro, published in the *Board of Trade Journal*:—

Some four years ago, Dr. V. A. dePerini discovered a fibre-producing plant in the State of Matto Grosso, at a height of about 3,000 feet. This plant, *Canhamo brasiliensis*, Perini, has a spinous stem and attains a height of 12 to 18 feet. It is said that this plant produces a fibre in its bark which compares favourably with flax in length, strength, fineness, flexibility, and adaptation for bleaching and dyeing. It is stated that it requires only three months to grow, and will therefore yield three crops a year. The wood of the stem is regarded as suitable for the manufacture of cellulose for paper-makers.

Two plantations of *Canhamo brasiliensis* have been laid down in the State of Rio de Janeiro, there being at present some 20 acres of the shrub under cultivation upon these plantations. It is said that £40 a ton has been offered for Canhamo fibre by British firms. The annual produce of three crops per acre is estimated at 77 (short) tons of fibre.

### Sale of Unsweated Cacao.

Reference was recently made in the *Agricultural News* (Vol. VI, p. 9) to the harm that was being done to the cacao industry in Grenada by the sale of unsweated cacao. The Agricultural Department has been giving attention to this important matter with the view of improving the grade of cacao offered for sale by the peasants. The Agricultural Superintendent reports:—

'The general practice is to put the beans out in the sun to dry at once, so that the only sweating process that they undergo is while drying—a matter of three or four days at most. This lowers the general standard of the peasants' cacao, and tends to produce a very mixed bulk. There is considerable difficulty in inducing peasants to keep their cacao longer, as they are eager to obtain their money as soon as possible, and do not realize that they might obtain higher prices by taking the trouble to produce a better article.'

With the view of bringing this point home to the small growers, the Agricultural Instructor takes round with him samples procured from the leading merchants in St. George's, to show that higher prices can be obtained for beans that are better prepared.



## Rubber in Southern Nigeria.

According to the *Annual Colonial Report* on Southern Nigeria, the value of the exports of rubber rose from £159,991 in 1904 to £226,387 in 1905. It is reported that this valuable product continues to show a considerable increase, and with systematic cultivation and collection it will become an important addition to the exports of the country.

During the year 1905, 119,800 seedlings of *Funtumia elastica* were transplanted from nurseries in the western division and planted out in the various sub-districts. Plantations were also made in the central division. There are now nearly three quarters of a million young plants living in the western division.

One large firm imported 10,000 seeds of the Para rubber tree from the East, and of this number 6,800 germinated successfully at Sapelli, where a plantation is being started. Para rubber seeds were imported by the Botanical Gardens at Calabar from the Cameroons and the Straits; the former failed to germinate, but out of 140 seeds from the latter, 120 plants were obtained and are doing well.

## Geology of Tobago.

As soils are made by the weathering of rocks, the geology of an island has an important bearing on its agriculture. Hence this abstract of the preliminary report of the Government Geologist on the rocks of Tobago is of interest to agriculturists.

There appears to be no evidence (such as lavas or tuffs) of any volcanic action on this island. The whole northern mountainous part of Tobago is formed of rocks which were originally grits, sandstones, and sandy clays. These have been metamorphosed into schistose feldspathic grits, and talcose and talc-mica schists. These rocks resemble those in the northern range of Trinidad. They contain but few small quartz veins and are often decomposed to a considerable depth. The resulting soil is of good mechanical composition, and never too impervious. It is probably rich in alkalies, though perhaps deficient in lime.

The middle and southern part of Tobago, except the extreme south, is formed of basic igneous metamorphosed rock, which has doubtless intruded from below. It belongs to a class of rocks composed chiefly of ferromagnesian minerals and lime-soda feldspars. It forms an excellent road-metal. It is often decomposed to a great depth and is locally called 'rotten rock.' It forms an excellent soil, which, though containing clay, never becomes too stiff or impervious. It is rich in lime, magnesia, and soda. Possibly it may be slightly deficient in potash and phosphates. The south-western part of Tobago is formed of nearly level Tertiary clays, sands, and shell-beds, often covered by terraces of recent coral limestone. Fragments of pitch are regularly washed up on the south-western coast, which indicate a submarine outcrop of an oil-bearing stratum of Tertiary or older rock. Borings through the coral limestone to about 200 feet deep would be necessary to ascertain if the oil-bearing stratum is continued into the south-western end of the island.

## Beet Sugar Industry of Canada.

It is stated in an article in the *Louisiana Planter* that sugar-beets have been grown for some years on experimental farms in Nova Scotia, Ontario, Manitoba, Saskatchewan, and British Columbia. In 1905, the average yield of eight varieties was nearly 34 tons per acre in Manitoba, but only 14½ tons in British Columbia. In the latter locality the percentage of sugar was very low.

There are only three beet sugar factories in Canada, two in Western Ontario and a larger one at Raymond, Alberta. In 1906 the total harvest at the last-named was 18,298 tons of beet; the tonnage per acre being only 6·77. There was a lack of labour and a number of acres could not be harvested. The beet farmers are paid \$5 per ton of beet, and the provincial parliament gives a subsidy of ½c. for every pound of sugar. It is proposed to grow sugar-beets on part of the 3,000,000 acres of land which are being irrigated by the Canadian Pacific Railroad.

## West Indian Trade with Canada.

In view of the visit of the Canadian Trade Delegation, a brief review of the trade between the West Indies and Canada is likely to be of special interest at the present time.

The Report of the Department of Trade and Commerce for the year ended June 30, 1906, just received from Ottawa, shows that the total volume of the trade carried on between Canada and the West Indies (including British Guiana) was less than in the previous year, the figures being \$10,767,435 (£2,243,215) and \$12,022,368 (£2,504,660), respectively. Both the value of imports into Canada from the West Indies and that of the exports from Canada to the West Indies were less in 1905-6 than in 1904-5.

Sugar is, of course, the product which figures most prominently in the list of imports into Canada from the West Indies. In 1905, the total value of the imports of sugars and molasses was \$8,237,725; in 1906, \$7,033,664. This is a decrease of \$1,204,061.

On the other hand, there was an increase of \$35,682 in the value of the fruit imports, from \$78,301 to \$113,983. For this increase bananas were chiefly responsible, 55,092 bunches (value, \$46,350) being imported, as against 22,428 bunches, valued at \$21,297, in 1905.

It should, however, be observed that the number of bunches of bananas received direct from the West Indies is small in proportion to the total imports of this fruit, which amounted to 1,219,486 bunches in 1905 and 1,200,534 bunches in 1906, the values being \$971,672 and \$1,171,387, respectively. These figures would suggest that there are considerable possibilities in a direct fruit trade between these islands and the Dominion. This is a matter that is likely to come up for consideration at the meetings now being held in the various West Indian Colonies to discuss trade relations between the two portions of the British Empire. It is also referred to elsewhere in these columns in its bearing on the new Canadian tariff.





## INSECT NOTES.

### Sugar-cane Pests in Hawaii.

The following reference to the pests of the sugar-cane in the Hawaiian Islands is extracted from the Report of the Board of Commissioners of Agriculture and Forestry of the Territory for 1905:—

In January a box of sugar-cane arrived from Australia; upon inspection the cane was found to be infested with boring lepidopterous larvae measuring from  $\frac{1}{16}$  inch to  $\frac{3}{4}$  inch. These worms burrow into and under the buds, destroying them for cuttings and injuring the vitality of the cane. A number of 'mealy bugs' (*Pseudococcus*) were also found under the leaves; as it was a new variety of cane, and being desirous of thoroughly disinfecting it from 'bud worms,' we used a strong charge of carbon bisulphide. Evidently, however, sugar-cane will not stand as strong a charge of that vapour as grape vines, or other plants or seeds requiring treatment by that method, for most of the cane was killed as well as the 'bud worms' and 'mealy bugs.'

Another importation of sugar-cane received from Fiji was treated with hydrocyanic acid gas before unpacking, in order to destroy any insects that might have developed in coming through the tropics and might be liable to escape when the case was unpacked. Each piece was inspected, with the following result: One cane borer beetle and two larvae of the same; one larva of a small *Buprestid* beetle cutting a transverse tunnel slightly under the surface, also a few adults and larvae of 'mealy bugs' (*Dactylopius calceolariae*).

Two packages of sugar-cane cuttings came in by mail from Queensland; upon inspection the cane was found to be seriously attacked by skin fungus, first appearing on the cane in small, pustule-like protuberances, afterwards rupturing the skin, from which issue the black fungus threads; besides the above fungus, strong colonies of 'mealy bugs' were hidden at the base of the leaves that were in a healthy condition and breeding as if they were in a cane field. The cane and packing were burned, saving samples of each pest in glass jars containing formalin.

Another importation of sugar-cane, this time from the Philippine Islands, consisted of two packages done up in bamboo. The sugar-cane contained evidence of what appeared to be a *Lepidopterous* cane borer and numerous punctures made by 'leaf-hoppers.' We consigned cane and packages to the fire.

### Antigua.

The following extracts, taken from Mr. Ballou's report on his recent visit to Antigua, contain references to the insect pests prevalent in that island:—

At the Botanic Station, a general improvement was noticeable since my previous visit. Then a long-continued drought had seriously affected many plants, and had been especially favourable to the development of many scale insects. On this last visit, however, I found the plants looking fairly strong and vigorous, as a result of recent rains, and fairly free from scales. Many plants which had out-grown the space allotted to them had been removed, and a consider-

able amount of spraying had been done, evidence of which could be seen on several plants where dead scales were found, but no live ones.

A few plants, mostly annuals, were found infested with scales; these were taken out and destroyed. Several palms were infested by the black line scale (*Ischnaspis filiformis*) and the West Indian red scale (*Aspidiotus articulatus*); a few orchids by the orchid scale (*Aspidiotus bififormis*); a *Thunbergia* vine by a species of shield scale (*Lecanium* sp.) and a white scale (*Chionaspis* sp.).

The red bug which feeds on the seeds of the balloon vine (*Cardiospermum* sp.) is still present in the nurseries, although it does not seem to do any particular damage.

On one estate where I examined cotton and limes, the early cotton was irregular in growth, as a result of the drought earlier in the season, and showed the presence of leaf blister-mite to a slight extent, while the later cotton was more uniform. The worm had not begun its attacks. A few limes were attacked by the red scale (*Aspidiotus ficus*). This is likely to be a serious pest, and every effort should be made to destroy it. Cotton in the newly cleared land in the Falmouth Harbour and Piccadilly districts seemed strong and vigorous, and likely to give good returns.

Several fields were seen in which old cotton had been left standing. Such cotton is a breeding place for pests, especially the leaf blister-mite. The efforts of cotton planters should be directed towards the prevention of such a course, on the part of a few individuals, to the injury of all.

## TOMATO CULTURE.

The following information as to the culture of the tomato is abstracted from an article in the *Rhodesian Agricultural Journal*, for December 1906:—

In a hot climate all varieties of tomato grow in profusion without the precautions and provisions necessary in colder countries. With the exercise of a little care in looking after the plants in their various stages of growth, tomatoes can be grown equal to anything in the more highly equipped gardens of England or America. Sutton's Peach Bloom and Perfection are most prolific and satisfactory in Rhodesia, and are equalled by Ponderosa and Champion. A good yellow tomato is Golden Queen. Tomatoes will thrive in almost any kind of ground, except undrained wet soil. Too much pen manure causes a great growth of foliage at the expense of the fruit. Small quantities of liquid manure will hasten the growth of the green fruit. The seeds should be sown separately in rows in boxes. If sown broadcast, the young plants are weak and spindly. A good distance for the transplanted seedlings is 2 feet in the rows and 4 feet between each row. Each plant should be tied to a stake. All lateral branches must be pinched off when 1 inch long, but the stem may be allowed to fork into two or four if desired. When 3 feet or more high and sufficient young fruit has set, the stem or branch should be topped and carefully tied to the stake. Any leaves which cover the fruit may be turned aside or removed, but the plant should not lose too many leaves. Regular watering and shallow cultivation will keep the plants in good condition.

On volcanic soils in the West Indies a mulch on the surface in dry weather and small applications of nitrate of soda have been found beneficial for tomatoes. Their roots are occasionally attacked by eel-worms, and there is reason to believe that in some cases they were infected with these as seedlings from the soil in the boxes in which they were grown.



## DISEASES OF COCOA-NUT PALMS.

The attention of cultivators of cocoa-nuts in the West India Islands has been called of late to the occurrence of a serious disease known as the 'bud-rot.' Mention has already been made of it in the *Agricultural News* (Vol. IV, pp. 299 and 369), and all the information relating to the disease was collected and reprinted in the *West Indian Bulletin* (Vol. VI, pp. 307-21) in the hope of assisting cocoa-nut planters. Owing, however, to the anxiety that was felt in regard to the cocoa-nut industry of Trinidad, where large numbers of palms were reported as having died, Mr. F. A. Stockdale, B.A., the Mycologist on the staff of the Imperial Department of Agriculture, after examining many specimens, paid a visit to that colony in July and August 1906, to inquire into the causes of the diseases of the cocoa-nut palms, which were reported to be prevalent there.

The Trinidad *Royal Gazette*, of February 14, 1907, publishes for general information a report by Mr. Stockdale on this visit, in which are described three different diseases attacking cocoa-nut palms in Trinidad. The three diseases have been called the 'Root disease,' the 'Leaf disease,' and the 'Bud-rot.' The following extracts have been taken from the report:—

The root disease is, without doubt, the most serious; it is widely distributed, and is causing considerable loss in some districts.

## ROOT DISEASE.

This is apparently caused by a fungus, a species of *Botryodiplodia*, and may be recognized by the yellowing and hanging down of the leaves, by the disorganized condition of the cortex of the roots, by the red ring of discoloration that may be seen in the stem, and by the pustules bearing fungus spores that are invariably seen, sooner or later, on the dead leaf-stalks (petioles).

The disease may spread through the soil by means of mycelium, by spores blown by the wind from tree to tree, and by means of the fall of diseased petioles, while replanting of supplies on diseased spots without proper cultivation and treatment may be a means of continuing the disease in the next crop of trees. The disease appears in all soils, but apparently spreads more rapidly and is more destructive in damp, low lying, undrained hollows. Undrained, uncultivated, neglected portions of any estate are a standing menace to the whole estate and perhaps to the whole district.

To prevent further spread of the disease, the following remedial measures have been suggested:—

- (a) All dead or dying trees, diseased leaves and petioles that have fallen to the ground, rubbish, etc., should be destroyed either by fire or by burying deeply with lime. All stumps should be grubbed up and as many diseased roots as possible destroyed.
- (b) When it is noticed that small areas are attacked, they may be isolated from the remainder of the estate by digging a good trench around them. This should prevent spread of mycelium in the soil to other portions of the estate.
- (c) Resting and cultivation of infected land that has been cleared and burnt before replanting 'supplies.'
- (d) Spraying and application of chemicals to destroy spores, and also mycelium in the soil.

- (e) Replanting should be done with ripe nuts from disease-resistant trees, if such can be found.

## LEAF DISEASE.

The leaf disease is limited to small areas, which are apparently in want of better cultivation.

It is caused by a fungus—a species of *Pestalozzia*—and may be recognized by the yellowish spots on the leaflets, especially near their tips. These spots gradually increase in size, the distal leaflets of the leaf turn yellow, then brown, and eventually die. When the leaflets of the terminal 2 or 3 feet of the leaf have died, this portion breaks off and hangs vertically downwards from the end of the dying leaf. (This is characteristic of the disease, and is probably due to the weight of the dead tip causing it to break off.) Eventually the whole leaf dies, and others become infected.

This fungus (*Pestalozzia* sp.) reproduces itself by means of spores on the upper surfaces of the leaflets, and is frequently accompanied by another fungus, *Diplodia epicocos*, the fructifications of which may be observed as small, black spots, generally along the veins of the leaflets near the mid-rib or on the petioles. Experiments so far indicate that the latter fungus is either saprophytic or only completes destruction commenced by *Pestalozzia*. The spread of this disease is accomplished by wind and rain, and therefore, besides making every effort to keep the cocoa-nut trees healthy and vigorous by improved cultural methods, all sources of infection should be removed, as they may be the cause of considerable damage during an unfavourable season.

The following remedial measures are recommended:—

- (a) All dead trees should be cut down and, with diseased leaves, etc., should be destroyed, preferably by fire.
- (b) Isolated trees that show signs of disease should be marked, carefully watched, and all leaves that become attacked cut out and burned.
- (c) All plants in the diseased area should, as a preventive, be sprayed repeatedly with Bordeaux mixture, particular attention being given to the younger leaves.

## BUD-ROT DISEASE.

A bud-rot disease was noticed in isolated cases in the Cedros district, and had apparently caused the death of many palms on a savannah in the Siparia district.

The cause of the trouble is somewhat obscure. The roots and stem of the palm appear to be quite healthy, while the bud is involved in a vile-smelling soft rot. In one instance, a fungus was present in the advancing margin of the diseased part, but generally bacteria were the only organisms present. Three kinds of bacteria were noticed, and two of them had previously been found in trees that were suffering from other causes. On no occasion could it be established, with certainty, how the bacteria gain an entrance, or whether they are the primary cause of the trouble.

In the Siparia district the spread of the disease was very rapid; but it is probable that more careful attention to cultivation, etc., and prompt destruction of all diseased material would tend to keep this disease well in hand.

Finally it must be urged that in dealing with the diseases of cocoa-nuts, the adoption of remedial measures must be carried out systematically by all interested in cocoa-nut cultivation; for, by co-operation of the planters in this matter, it would be possible to check the diseases and probably to eradicate them.





## GLEANINGS.

Messrs. Railton & Cole announce that they are prepared to receive cotton for ginning at Colébrooke's ginnery, Antigua. The charge will be at the rate of  $1\frac{1}{2}d.$  per lb.

In South Cameroon, it is stated in a communication to the *Tropenpflanzer*, it has been found practicable to propagate *Funtumia elastica* by cuttings, which root in about five weeks.

In the *Journal d'Agriculture Tropicale*, for January, it is stated that circumposition or marcottage is recommended in Cochin China for the propagation of choice mangos.

The *Journal d'Agriculture Tropicale*, for January, mentions that there is a rising demand for cocoa-nut fibre, the best fetching from about £1 5s. to £3 for 220 lb., when prepared and spun into cord.

The Manager of the British West Indian Fruit Company reports: 'There is a good deal of land suitable for growing fruit in Tobago. I was over there a few months ago, and visited several of the large estates.'

The American beet sugar industry is expanding rapidly. In 1900, the crop was not worth seven million dollars, whereas now it is valued at considerably more than forty million dollars. (*International Sugar Journal*.)

A small consignment of Sea Island cotton from Bermuda which was examined by the Imperial Institute was valued at  $13d.$  to  $14d.$  per lb., Sea Island being quoted at  $14d.$ , and extra fine Sea Island at  $21d.$  per lb. on the same date. There was some stained cotton in the sample.

In the *Annales de l'Institut Colonial de Marseille*, a reference is made to the origin of the name 'sand-box' as applied to *Hura crepitans*. The fruit, after being boiled in oil and pierced with small holes, is filled with fine sand, and used in the French colonies for dusting on wet ink as a substitute for blotting paper.

The present low price for sugar, the principal product for export from Martinique, makes the cultivation of sugar-cane unprofitable. Rum is manufactured in large quantities, and is second in the list of exports. Cacao is grown to some extent, but the exports do not seem to be increasing. (*U. S. Monthly Consular Reports*.)

The Agricultural Instructor at Tortola reports that there is a growing interest in the cotton industry in the Virgin Islands. On February 19, sufficient good cotton had been received at the factory to give about 5 bales, exclusive of that grown at the Experiment Station, and sufficient medium cotton to give about 6 bales. The bulk of the crop had not yet been received.

It is proposed to establish a public museum in Dominica and the Administrator will be glad to receive donations to form a collection of exhibits likely to prove of general interest. (*Official Gazette*.)

The *Bulletin of the Imperial Institute*, Vol. IV, no. 4, 1906, notes that there is a demand for transparent, colourless quartz crystals at £20 per ton. Such crystals are found to some extent in Nevis and perhaps in other West India Islands.

During the year ended June 30, 1906,  $18\frac{1}{2}$  million cocoa-nuts were exported from Cuba. Each tree yields, on the average, sixty nuts a year. First-class nuts are worth \$10 to \$18 per thousand. Nearly 30 per cent. of the nuts are small or bad.

In a report on the results of his survey of the foreshore of Kingston Harbour since the earthquake, the Harbour Master states: 'There is in places considerable subsidence, also at the eastern edge of the Palisados, where I got 4 fathoms of water over mangrove bush, which had hitherto been above water.'

The Government of the Cape of Good Hope has instituted a system of inspection of fruit intended for export. Every box of fruit considered by the Inspector as suitable for export will be branded by him with the Cape of Good Hope coat of arms, encircled by the words 'Passed by Government Inspector.' (*Board of Trade Journal*.)

Mr. Algernon E. Aspinall, Secretary of the West India Committee, has recently prepared a 'Pocket Guide to the West Indies.' The price of this guide, which is published by Edward Stanford, Long Acre, London, W.C., is 6s. It contains 328 pages, eight maps, and twenty-nine illustrations.

A sample of dried leaves of the jaborandi (*Pilocarpus pennatifolius*), grown at the Botanic Station, Dominica, has been received from the Curator. This has been sent to England with a view to ascertaining whether jaborandi leaves grown in Dominica are equal in value to those produced in Brazil. References to this plant and the drug pilocarpin obtained from it will be found in the *Agricultural News*, Vol. II, p. 406, and Vol. III, p. 94.

The production of raffia fibre in Madagascar is becoming better known in the European and American markets. It is woven by the natives into every variety of fabric, from the coarsest for packing to the most fanciful for dresses and jackets. It has the appearance of yellow silk when finely woven, and is being utilized for making Panama hats. It partakes of the properties of fibre and straw, and can be spun or split to a fine degree. (*U. S. Monthly Consular Reports*.)

The possibilities of British Guiana as a rubber-producing country have of late received considerable attention. Of this article, which as an export of the colony was unknown until last year, when a few hundred pounds were collected, nearly 4,000 lb. have been exported for the year. Already a few hundred acres have been planted in indigenous rubber trees in the North-west District, and several applications for concessions for the cultivation of rubber have been made to the Government. The potentialities of the colony in this connexion are generally considered to be promising. (*Annual Colonial Report*, 1905-6.)



## TAPPING FUNTUMIA RUBBER.

The following interesting letter on the tapping of Funtumia rubber trees has been received from H. M. High Commissioner of Uganda (Mr. H. Hesketh Bell, C.M.G.):—

Government House,  
Entebbe, Uganda,  
January 3, 1907.

To the Editor of the 'Agricultural News.'

Dear Mr. Editor,—I have just been reading in the Bulletin of the Imperial Department of Agriculture a very interesting account by Mr. Joseph Jones of the experimental tapping of various kinds of rubber trees in the Dominica Botanic Station, and I note that he is rather troubled by the dark colour of the produce, more especially that yielded by the Funtumia trees. In view of the great interest that is now being taken in the cultivation of rubber in the West Indies, it may be useful to some of your readers to know how the latex of rubber is treated in Uganda.

In some of the great forests of this territory, considerable numbers of trees of the *Funtumia elastica*, or 'Lagos Silk Rubber' are found, and concessions for the sole right of tapping these trees are held by various companies. While visiting the Budonga Forest lately, I had an opportunity of observing the manner in which the crude latex is treated. The milk is obtained by making small 'herring-bone' incisions in one side of the trunks of the trees. These incisions are made with a V-shaped tapping tool, and reach from the base of the tree up to a height of 40 or 50 feet. Funtumia, growing in a forest in its natural condition, has a slender straight stem of great height, and branches only at the top. The trees are tapped every three months, so that, in each year, every side of the trunk has been made to yield its milk. The average yield of latex, at each tapping, is about 1 quart from each tree, and each stem may be expected to give about 1 lb. of pure rubber per annum.

The milk is brought at once to the factory and is allowed to stand for a couple of days in large earthenware pots. It is then strained through pieces of red cotton, known as 'Turkey red,' for the removal of impurities. An equal quantity of water is added to the latex, and about a pint of the mixture is placed at a time in a small earthenware vessel. This small pot is then placed in a larger vessel containing water maintained at a temperature just below boiling point, after the fashion of a 'bain-marie.' Carbonate of potash is added in the proportion of 1 per cent. to the latex and water, and the mixture is stirred with a wooden spoon until it coagulates. This usually occurs after three or four minutes. In the factory which I inspected there was a rough and ready 'range' of six small fires, so that half a dozen lots of latex could be dealt with simultaneously. Each pot, however, required the attention of one man. The carbonate of potash appears to prevent the rubber from turning to a dark colour. As soon as the latex has coagulated, the 'dollop' of rubber is taken out of the pot and placed under a press, so that all the moisture may be extracted from it. The press is very much like the sort used for taking copies of letters in offices, and being supplied with four or five boards can deal with several cakes of rubber at a time. The one I saw was worked by two men, and the pressure exerted was so great that each clot of rubber was quickly transformed into a very thin 'pancake' of creamy-white colour, each bearing the initials or brand of the company. This process very effectually extracts not only all the water but also nearly all the resin in the rubber. The pancakes, after passing through the press are thoroughly washed in water and placed to dry in the shade,

on shelves made of reeds. The rubber gradually assumes a dark amber colour, but it is almost perfectly clean and transparent. In a few days it is fit for transport. I have much pleasure in sending you a sample of the rubber thus prepared, and would ask you, after inspection, to send it to the Curator of the Botanic Station at Dominica.

A considerable quantity of Funtumia has been planted in the West Indies during the last two or three years and these notes may be of interest to the planters there. I may add that the produce of the Funtumia, obtained by the process above described, is now selling in London at 5s. 6d. per lb., a price almost equalling that obtained for the best Para. It has heretofore been thought that Funtumia rubber could not compare in value with the product of Para or of Castilloa.

I am, etc.,  
(Sgd.) H. HESKETH BELL.

## LIVERPOOL COLONIAL PRODUCTS EXHIBITION.

Brief mention was made in the last issue of the *Agricultural News* (p. 57) that Barbados, Montserrat, and Antigua, were to be represented at the Colonial Products Exhibition to be opened by the Earl of Elgin on March 12.

The exhibit shipped by the Permanent Exhibition Committee at Barbados comprised samples of Sea Island cotton, sweet potatoes, yams, various kinds of sugar, molasses, rum, manjak and crude petroleum, shaddocks, grape fruit, oranges, etc.

The exhibit sent from Montserrat is fully representative of the agricultural industries of the island, containing nearly every article of commercial value produced there. An excellent photograph of the exhibit, kindly taken by Mr. J. T. Allen, has been received by the Imperial Commissioner of Agriculture, which it may be possible to reproduce later in the *Agricultural News*.

In reference to the Antigua exhibit, the following memorandum has been prepared by Mr. H. A. Tempny, B.Sc. :—

The Permanent Exhibition Committee of Antigua have forwarded a small exhibit to the Liverpool Colonial Products Exhibition, consisting of various articles representing the industries and resources of the island, which, together with a collection of tastefully mounted views of the island and a number of native curios, combined to make up an attractive display. In addition, a leaflet has been prepared for distribution at the exhibition giving a brief account of the character and resources of the island.

The exhibit was on view at the rooms of the Agricultural Society on Monday, January 28, when his Excellency the Governor and a number of members of the society inspected it, and expressed approval at the character of the work done by the committee.

The exhibit has been consigned to the care of Mr. A. E. Aspinall, Secretary of the West India Committee, who will receive it on arrival and arrange for its display at Liverpool.

The cost of the undertaking has been borne by a vote from the Government, which has also expressed its willingness to further the work of the committee by placing annually on the estimates a small sum to assist in defraying the cost of similar undertakings in the future.



## CONSTRUCTION IN EARTHQUAKE COUNTRIES.

The following note, by Professor John Milne, F.R.S., D.C.L., appears in the last issue of the *West India Committee Circular* :—

Almost everybody realizes that earthquakes can neither be predicted nor prevented, but there are a certain number of people who know that their effects may be mitigated. The mitigation of earthquake effects is an extensive subject, and for years past, in the Imperial University of Tokio, some twenty lectures have been given annually to students of engineering and of architecture as to how to bring this about. That the subject is very important may be judged of by the attention which the Japanese Government give to it. Whenever a large earthquake occurs in any part of the world—as, for example, in Manila, in Assam, or, as quite recently, in San Francisco—amongst those who are making notes in connexion with the disaster, you find present the Japanese engineer, architect, and seismologist. They go to these places at the instigation of their Government to find out what fell and what stood, and the reasons why it fell or stood, and to report on the same to their Government. No doubt they also collect many notes of scientific importance; but their chief object is to discover that which may be of immediate importance to their own country. Years and years ago, they collected from every country where earthquakes were frequent all the information they could get with regard to forms of construction which might palliate seismic effects. This they have supplemented by observations made in their own country, where earthquakes are so very frequent, together with elaborate experiments on the stability of various types of buildings. The general result is that in Japan we find certain styles of construction for ordinary dwelling houses, for warehouses, for large buildings, for bridge piers, and for other structures, which differ widely from corresponding structures, the outcome of ordinary engineering and architectural practice. The new types of construction have been standing for years and shaken frequently, but they have not been shattered, whilst old types have been more or less ruined. Many countries have made laws or regulations in respect to building in earthquake districts. From the laws of Ischia we learn that the Government has pointed out certain districts which are more or less immune from earthquake effects and other districts or plots of ground where buildings should not be placed. Many countries other than Japan have also designed buildings which should be able to withstand earthquake effects. Models of many of these are to be seen in Japan, but although Britain has interests in so many earthquake-shaken districts, I am not aware that they are to be found in this country. When constructing in earthquake-shaken districts, the sites for buildings have to be most carefully chosen. Experience has shown that you can get two patches of ground, within 100 yards of each other, one of which is dangerous, and the other comparatively immune. Very much relating to foundations may be found in the building regulations of various countries. The roofs of buildings, walls, chimneys, and piers are also matters which have received considerable attention. Tall chimneys are elements of danger unless constructed so that they have considerable elasticity. The form of piers for bridges as now constructed in Japan would probably excite the curiosity of the engineer from Europe. At the time of earthquakes, retaining walls of reservoirs and water towers have given way; the forms of these have in certain earthquake countries been greatly modified. Several capitals of large countries—as for example the old capitals of Japan, San Salvador, and Guatemala—like Port Royal, have

been moved to a new place. If we except the effects due to wind pressure and sea waves, ordinary engineering practice usually looks to effects due to vertical pressures rather than to horizontal accelerations applied at the base of a structure. These accelerations have been measured, with the result that the engineer or builder has to deal with forces which can be expressed in mechanical units, and which act in known directions. The idea that to withstand earthquake effects, buildings should have 'weight and great inertia' is one, which in the past, has led to mischief. If a building has 'weight' it certainly has 'inertia,' and it is 'inertia' which makes buildings self-destructive. The new knowledge about the nature of earthquake motion has already led to the saving of life and property, particularly in Japan, and it is to be hoped that Jamaica will take advantage of experiences in other countries.

## MAKING BLOCK RUBBER.

Reference was made in the *Agricultural News* (Vol. V, p. 377) to the new method of preparing rubber for the market in the form of 'blocks.' The *Handbook of the Ceylon Rubber Exhibition* contains the following information in regard to the manufacture of block rubber :—

(1) The fresh rubber after coagulation is passed between grooved rollers, over which a stream of water is running. By this means it is ground up and the impurities are washed out. It is then passed through smoother rollers which form it into crêpe or into sheet rubber.

(2) The crêpe or sheet rubber is dried in a vacuum drying apparatus (for two or three hours). It is then at once piled up in a screw or hydraulic press and compressed into a solid block before the surface has time to oxidize.

(3) A block of 1 cubic foot will weigh 50 lb., so that there is a saving in ocean freight over crêpe or sheet of perhaps one half.

(4) A specimen of wet crêpe was prepared at the Exhibition from the latex in twenty minutes. With a vacuum drier it could be dried in one and a half hours and immediately pressed into a block. This saves much time as compared with the period taken to dry biscuit rubber.

(5) Biscuit and sheet rubber often become tacky. This state is infectious; bacteria, moulds, and an oxidizing enzyme have been found on tacky rubber. Crêpe rubber, being easier to dry, does not become tacky, and when pressed into a block, there is far less surface presented for bacterial action.

The following note on preparing block rubber has been received from Dr. J. C. Willis, Director of the Royal Botanic Gardens in Ceylon :—

At the Ceylon Rubber Exhibition it was suggested by Dr. Willis that it might be advisable, instead of, as at present, drying the plantation rubber till it only contains about 5 per cent. of moisture, to block it in the wet, freshly coagulated condition. Experiments with this object were at once carried out by Mr. Kelway Bamber, the Ceylon Government Chemist. He prepared the rubber with creosote (to prevent decay and mould) and blocked it at once, getting blocks containing about 9 per cent. of water. These sold in London for 5s. 6d. per lb., against 5s. 7d. to 5s. 9d. for the ordinary dry Ceylon rubber, thus really getting a much better price. A circular (*Circular and Agricultural Journal* of the Royal Botanic Gardens, Peradeniya, Vol. IV, no. 1) has been lately issued dealing with this matter, and it would seem likely that the old way of making dry biscuits or sheets will soon be extinct.



## WEST INDIAN PRODUCTS.

### Drugs and Spices in the London Market.

The following report on the London drug and spice market for the month of January 1907 has been received from Mr. J. R. Jackson, A.L.S.:—

Since our last notes on the market for December, there have been disturbing elements to the progress of business. The Christmas holidays, which were closely followed by the annual stock-taking, retarded the sales to such an extent that but little actual business was done till the middle of January. A brighter prospect had been anticipated for trade generally, but almost at the moment of the opening market the news arrived of the terrible disaster to Jamaica, which at once had a depressing effect, combined with a feeling of intense sympathy with the colony. It will be seen from the following notes, however, that the principal Jamaica products have been but little affected up to the time of writing.

#### GINGER.

At the first auction, on the 9th., about 20 packages of Jamaica were offered, and 5 sold at 59s. to 61s. for ordinary to fair ordinary, part wormy. The offerings of Cochin and Calicut amounted to 95 cases, 409 bags, and 56 bales, 110 of which were disposed of at rates ranging from 25s. 6d. to 50s. At the last auction, on the 30th., no Jamaica was offered, but it was stated that higher prices were being asked privately; of Cochin, some 1,000 packages were offered, and about 80 sold at steady rates, viz., 34s. to 35s. for washed rough, 35s. for fair Calicut rough, 40s. for fine, 32s. 6d. for cuttings, and 55s. to 60s. for native cut.

#### NUTMEGS, MACE, AND PIMENTO.

At the first sale, some 83 packages of West Indian nutmegs were offered, 53 of which were disposed of at easier rates: 71's realizing 10d.; 74's, 9d.; 80's, 9d.; 84's, 6½d.; 87's, 8d.; and 124's, 5½d. Out of 39 boxes of Singapore nutmegs, 20 were sold without reserve, 80's of old import fetching 10½d. A week later, prices generally were somewhat lower, and no further change occurred during the rest of the month. Of mace, 19 packages were offered and sold at the first spice sale at the following rates: pale reddish, 1s. 3d. to 1s. 4d.; fair red, 1s. 3d.; palish wormy, 1s. 4d.; broken, 1s. to 1s. 2d. per lb.; a week later, prices had advanced 1d. and 2d. per lb. No further change occurred during the rest of the month. Of pimento, 418 bags were offered on the 9th., and 50 were sold without reserve at 2½d. to 2½d. per lb. On the 23rd., there was a steady demand, sales being effected at 2¾d. for fair, at which price 20 bags were sold out of a total of 95 offered. On the 30th., pimento was bought in at the same price, the offerings amounting to 176 bags.

#### ARROWROOT AND SARSAPARILLA.

At the second spice sale, 360 barrels of St. Vincent were offered and 100 sold at 2½d. for good manufacturing, a price which was maintained at succeeding sales to the end of the month, when 42 barrels were disposed of out of an offering of 132.

At the first drug sale, on the 17th., advanced prices were obtained, the following being the quotations: Lima-Jamaica, mostly fair, part roughish, 1s. 9d. per lb., while 13 bales of genuine grey Jamaica fetched 2s. 5d. per lb., and another 10 bales 2s. 6d. At the last auction, on the 31st., 8 bales of grey Jamaica were offered, and the whole of them sold with keen competition at 2s. 11d. to 3s., irrespective of quality

#### CASSIA FISTULA, OIL OF LIME, KOLA, ETC.

On the 17th., 3 bags of good, bold, fresh Cassia Fistula pods from Dominica were offered and disposed of at 16s. At the spice auction on the previous day, 2 cases of West Indian distilled oil of lime fetched 2s. 6d. to 2s. 7d., and 2 other cases of bottles sold at 3s. 4d. At the last sale, on the 31st., 5 bales of Canella alba bark from New York were offered but not sold, the reserve price being 75s. Of kola, 5 parcels, chiefly from Jamaica, were offered on the 17th.; 2 of them sold at 2¾d., and 12 other packages from 2½d. to 3d. A fortnight later 8 bags of mouldy Jamaica were put up for sale, and all were disposed of at 2½d. per lb.

## WEST INDIAN SUGARS AND CANADIAN PREFERENCE.

The following letter has been received from Mr. J. Russell Murray, dated February 14, 1907, in continuation of that published in the last issue of the *Agricultural News* (p. 63), relative to the status of raw sugars shipped from the West Indies to Canada via New York, and to their participation in the benefits of the preferential tariff:—

By last mail I forwarded to you a copy of a letter from the Minister of Customs relative to the importation of West India sugar via New York to Canada. This letter advised me that the preferential tariff would be available for such shipments.

In the week following, however, the Hon. Mr. Fielding brought into Parliament an amendment to the original tariff, by which he practically cancels the above arrangement, and makes it necessary that all British sugar, to be available for the preferential tariff, must be landed at a Canadian port. This amendment has not yet finally passed the House, but I am afraid there is little likelihood of it being altered. I will advise you in due course.

## DEPARTMENT NEWS.

Sir Daniel Morris, K.C.M.G., Imperial Commissioner of Agriculture, sailed in the S. S. 'Olenda' on February 27 for Trinidad and British Guiana. Sir Daniel proposed to accompany the Delegation of Canadian business men who are visiting the West Indies, as representatives of the Boards of Trade of Toronto, St. John, and Halifax, with a view to securing closer trade relations between these islands and the Dominion. It is expected that Sir Daniel will return to Barbados on March 9.

**Fixation of Nitrogen.** It is greatly to be desired that the lay press should avoid making sensational statements and refrain from the use of startling headlines relating to matters of which they evidently have little knowledge. The articles going the round of the press on the utilization of the nitrogen of the air make statements which are not new, while it is premature to treat them as wholly true. The production from the air of calcium cyanamide has now been known for some few years, and it has already been used experimentally and found to be about equivalent in value as a fertilizer to sulphate of ammonia. An attitude of expectant hope would seem to be the most appropriate feeling in which to indulge for the present. (*Gardeners' Chronicle*.)



## MARKET REPORTS.

**London**,—February 12, 1907. 'THE WEST INDIA COMMITTEE CIRCULAR,' Messrs. KEARTON, PIPER & Co.; Messrs. E. A. DE PASS & Co., February 8, 1907; 'THE LIVERPOOL COTTON ASSOCIATION WEEKLY CIRCULAR,' February 8, 1907.

ARROWROOT—St. Vincent, 2 $\frac{3}{4}$ d. per lb.  
BALATA—Sheet, 1/8 to 2/-; block, 1/6 to 1/7 per lb.  
BEES' WAX—£7 15s. to £8 per cwt.  
CACAO—Trinidad, 88/- to 95/- per cwt.; Grenada, 76/- to 82/- per cwt.  
COFFEE—Jamaica, good to fine ordinary, 43/- to 47/-; greenish to fine, 51/- to 123/- per cwt.  
COPRA—Trinidad, £25 10s.; East Indian, £27 per ton.  
COTTON—Good medium fine, 7d.; West Indian Sea Island, good medium, 18 $\frac{1}{2}$ d.; medium fine, 19 $\frac{1}{2}$ d.; fine, 21d.  
FRUIT—  
GRAPE FRUIT—6/- to 6/6 per box.  
BANANAS—Jamaica, 4/- to 6/- per bunch.  
ORANGES—Jamaica, 5/- to 7/- per box.  
PINE-APPLES—St. Michael's, 1/9 to 4/- each.  
FUSTIC—£4 5s. to £4 15s. per ton.  
GINGER—Jamaica, common, 58/- to 60/-; medium to fine, 62/- to 85/- per cwt.  
HONEY—17/- to 23/- per cwt.  
ISINGLASS—West Indian lump, 2/5 to 2/6; cake, 1/1 per lb.  
LIME JUICE—Raw, 1/- to 1/4 per gallon; concentrated, £22 per cask of 108 gallons; Distilled Oil, 2/8 to 2/9 per lb.; hand pressed, 3/- to 3/4 per lb.  
LOGWOOD—£4 5s. to £4 15s.; roots, £3 5s. to £4 5s. per ton.  
MACE—Fair pale, 1/6 to 1/7; fair to pale red, 1/4 to 1/5 per lb.  
NUTMEGS—76's, 9d.; 109's, 6d.; 141's, 4 $\frac{1}{2}$ d. per lb.  
PIMENTO—Fair, 2 $\frac{3}{4}$ d. to 2 $\frac{1}{4}$ d. per lb.  
RUM—Jamaica, 2/9; Demerara, 1/2 to 1/3 $\frac{1}{2}$  per proof gallon.  
SUGAR—Crystals, low to good yellow, 15/6 to 16/9; good to fine, 17/- to 17/6, per cwt.; Muscovado, 14/- to 15/- per cwt.; Molasses, 11/6 to 12/- per cwt.

**Montreal**,—January 18, 1907.—Mr. J. RUSSELL MURRAY.  
(In bond quotations, c. & f.)

COCOA-NUTS—Jamaica, \$27.00; Trinidad, \$25.00 per M.  
COFFEE—Jamaica, medium, 10c. to 12c. per lb.  
GINGER—Jamaica, unbleached, 13c. to 14c. per lb.  
MOLASSES—Barbados, 27c. to 28c.; Antigua, 25c. to 26c. per Imperial gallon.  
NUTMEGS—Grenada, 110's, 15c. to 16c. per lb.  
PIMENTO—Jamaica, 5 $\frac{1}{4}$ c. to 5 $\frac{1}{2}$ c. per lb.  
SUGAR—Grey crystals, 96°, \$1.98 to \$2.05 per 100 lb.  
—Muscovados, 89°, \$1.40 to \$1.50 per 100 lb.  
—Barbados grocery, \$2.10 to \$2.25 per 100 lb.

**New York**,—February 21, 1907.—Messrs. GILLESPIE BROS. & Co.

CACAO—Caracas, 18 $\frac{1}{2}$ c. to 19c.; Grenada, 17c. to 17 $\frac{1}{2}$ c.; Trinidad, 18c. to 18 $\frac{1}{2}$ c.; Jamaica, 15c. to 16 $\frac{1}{2}$ c.; Dominica, 16c. to 16 $\frac{1}{2}$ c. per lb.  
COCOA-NUTS—Jamaica, \$23.00 to \$25.00; Trinidad, \$21.00 to \$22.00 per M.  
COFFEE—Jamaica ordinary, 7 $\frac{3}{4}$ c. to 8c.; good ordinary, 8 $\frac{1}{2}$ c. per lb.  
GINGER—Dark scraggy root, 10 $\frac{1}{4}$ c. to 11c.; small to bright bold, 11 $\frac{1}{2}$ c. to 13c. per lb.  
GOAT SKINS—Jamaica, Antigua, and Barbados, 62c.; St. Kitt's, St. Thomas, and St. Croix, dry flint, 55c. to 57c. per lb.  
GRAPE FRUIT—Jamaica, \$4.00 to \$5.00 per barrel; \$2.00 to \$2.50 per box.  
LIMES—Dominica, \$5.00 to \$6.00 per barrel.  
MACE—33c. to 35c. per lb.

NUTMEGS—95's to 100's, 16c.; 100's to 110's, 11 $\frac{1}{2}$ c. to 12c. 130's, 11c.  
ORANGES—Jamaica, \$3.50 to \$4.00 per barrel; \$1.75 to \$2.00 per box.  
PIMENTO—5 $\frac{1}{16}$ c. to 5 $\frac{1}{8}$ c. per lb.  
SUGAR—Centrifugals, 96°, 3.38c. to 3.42c.; Muscovados, 89°, 2.88c. to 2.92c.; Molasses, 89°, 2.63c. to 2.67c. per lb., duty paid.

## INTER-COLONIAL MARKETS.

**Barbados**,—February 26, 1907.—Messrs. T. S. GARRAWAY & Co., and Messrs. JAMES A. LYNCH & Co.

ARROWROOT—St. Vincent, \$3.90 to \$4.75 per 100 lb.  
CACAO—Dominica, \$12.00 to \$15.00 per 100 lb.  
COCOA-NUTS—\$14.00 per M. for husked nuts.  
COFFEE—\$10.25 to \$10.50 per 100 lb.  
HAY—85c. to \$1.20 per 100 lb.  
MANURES—Nitrate of soda, \$65.00; Ohlendorff's dissolved guano, \$55.00; Cotton manure, \$42.00; Cacao manure, \$42.00 to \$45.00; Sulphate of ammonia, \$75.00; Sulphate of potash, \$67.00 per ton.  
MOLASSES—18c. per gallon.  
ONIONS—\$2.90 to \$3.00 per 100 lb.  
POTATOS, ENGLISH—Nova Scotia, \$2.20 to \$2.30 per 160 lb.  
RICE—Demerara, \$5.65; Ballam, \$5.90 per bag (190 lb.); Patna, \$3.75; Rangoon, \$2.90 per 100 lb.  
SUGAR—Muscovado, \$1.40 per 100 lb.  
SYRUP—16 $\frac{1}{2}$ c. per gallon.

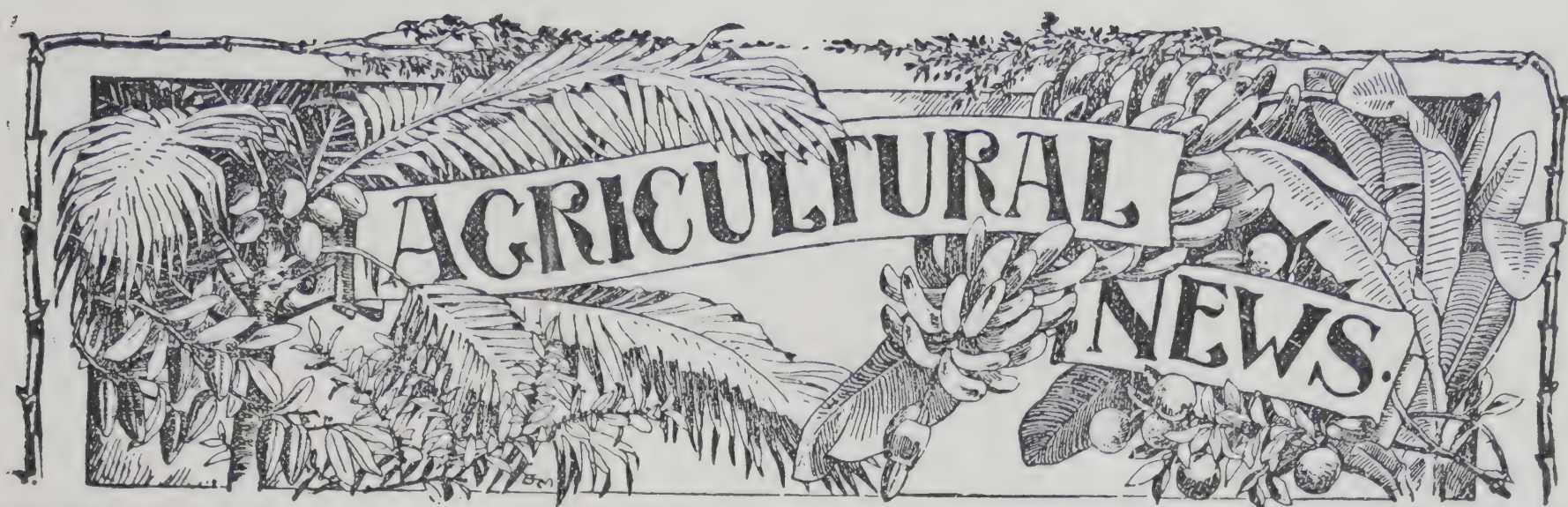
**British Guiana**,—March 2, 1907.—Messrs. WIETING & RICHTER.

ARROWROOT—St. Vincent, \$11.50 per barrel.  
BALATA—Venezuela block, 25c.; Demerara sheet, 38c. per lb.  
CACAO—Native, 17c. to 18c. per lb.  
CASSAVA—60c. to 80c. per barrel.  
CASSAVA STARCH—\$6.00 per barrel.  
COCOA-NUTS—\$10.00 to \$12.00 per M.  
COFFEE—Creole, 14c. to 15c.; Jamaica, 14c. to 14 $\frac{1}{2}$ c. per lb.  
DHAI—\$4.30 to \$4.35 per bag of 168 lb.  
EDDOS—\$1.00 to \$1.44 per barrel.  
MOLASSES—16c. per gallon.  
ONIONS—Madeira, 4c. to 4 $\frac{1}{2}$ c. per lb.  
PLANTAINS—32c. to 48c. per bunch.  
POTATOS, ENGLISH—Nova Scotia, \$3.00 to \$3.25 per barrel.  
POTATOS, SWEET—Barbados, \$1.20 to \$1.44 per bag.  
RICE—Ballam, \$5.90 to \$6.00 per 177 lb.; Creole, \$4.75 to \$4.80 per bag (ex store).  
SPLIT PEAS—\$5.90 to \$6.00 per bag (210 lb.).  
TANNIAS—No stock.  
YAMS—White, \$2.64; Buck, \$2.40 per bag.  
SUGAR—Dark crystals, \$2.00 to \$2.10; Yellow, \$2.50 to \$2.60; White, \$3.50 to \$3.60; Molasses, \$1.40 to \$1.75 per 100 lb. (retail).  
TIMBER—Greenheart, 32c. to 55c. per cubic foot.  
WALLABA SHINGLES—\$3.00, \$3.75, and \$5.25 per M.

**Trinidad**,—March 2, 1907.—Messrs. GORDON, GRANT & Co.

CACAO—Ordinary to good red, \$18.00 to \$18.25; estates, \$18.60 per fanega (110 lb.); Venezuelan, \$18.75 to \$19.25.  
COCOA-NUTS—\$21.00 per M., f.o.b.  
COCOA-NUT OIL—\$1.25 per Imperial gallon (cask included).  
COFFEE—Venezuelan, 9c. to 10c. per lb.  
COPRA—\$4.50 to \$4.75 per 100 lb.  
DHAI—\$4.60 to \$4.75 per 2-bushel bag.  
ONIONS—\$3.00 to \$4.00 per 100 lb. (retail).  
POTATOS, ENGLISH—\$1.40 to \$1.75 per 100 lb.  
RICE—Yellow, \$5.40 to \$5.60; White, \$5.75 to \$6.00 per bag.  
SPLIT PEAS—\$5.50 to \$5.60 per bag.  
SUGAR—Yellow crystals, \$2.25 to \$2.50; molasses, \$2.00 to \$2.25 per 100 lb.





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tions cannot fail to secure a larger appreciation of these islands. Chief among their causes is the improvement in the transport facilities between the West Indies and the United Kingdom, and also between these islands and the United States and Canada. As a consequence, tourists are visiting the West Indies in greater numbers every year, and in some of the islands efforts have been made, by the erection of good hotels and in other ways, to cater for the tourist trade, which is becoming an important asset.

An excellent climate, beautiful scenery, and the presence of many natural objects of interest have assisted in spreading a wider knowledge of the attractions and resources of the West Indies. These facts have been advertised in guides and other descriptive literature in such a way as to attract visitors. Furthermore, the old idea that the West Indies were unhealthy and consequently to be shunned by all, except those whose professional or business duties necessitated their visiting or living here, is disappearing. With the recently acquired knowledge as to the conveyance by mosquitos of the parasites causing malaria, yellow fever, etc., most of these tropical diseases have become preventable and so have lost their dangerous character.

## The Revival of Interest in the West Indies.

**O**F late years there have been many manifestations of greater interest being evinced towards the West Indies by other countries—more especially the mother country. These manifesta-

While the tourist trade has some direct bearing on the prosperity of the islands, its indirect effects are more far-reaching. Among the tourists there are naturally many persons directly or indirectly interested in commerce, to whom first-hand knowledge of the conditions, resources, and requirements of the West Indies has proved useful, and who have thereby been



enabled to take part in the development of West Indian trade.

Even such catastrophes as the volcanic eruption at St. Vincent and the recent earthquake at Kingston, deplorable as they were, have served to elicit greater sympathy towards the residents in countries in which such disasters may occur, and have had the effect of drawing increased attention to the circumstances and possibilities of the West Indies. In fact, at the present time, these islands are undoubtedly under the notice of the public abroad to a greater extent than they ever were before.

In England the ignorance as to these old possessions, so long deplored by West Indians, is fast disappearing. Interest in the West Indies is now no longer centred in a few interested people in London. Consequent on the popularizing of the banana, as a result of the operations of the Imperial Direct Steamship Service and of Messrs. Elders & Fyffes, Ltd., this interest has spread throughout the whole of the fruit trade; while the extension of cotton growing has brought the West Indies into intimate touch with that vast industry—the cotton trade of Lancashire.

The recent visit of the representatives of the British Cotton-growing Association has been instrumental in attracting increased attention to the possibilities of the West Indies in connexion with the growth of cotton, and to the value of these possessions as a source of the supply of much of the best cotton required by the Lancashire trade. The importance of the presence of these and other influential visitors who came to the West Indies in the 'Port Kingston' has already been realized in these islands.

In addition to the representatives of the cotton industry, there were also a number of gentlemen who were interested in the general trade between Great Britain and the West Indies—men who were keenly alive to the desirability of bringing about a closer trade relationship. Thus, one of these visitors, Alderman Howell Davies, M.P., speaking at Bristol on February 5, referred to the expedition as 'marking an effort on the part of the people here to make a conquest of the trade which has been fast slipping from our fingers in the West Indies.' This matter was freely discussed on the voyage, and the effect of these discussions is already being observed.

Closer commercial relations between Bristol and Jamaica have been advocated in a series of able articles in the *Bristol Times and Mirror*. The writer suggests that the moment is opportune for strengthening the ties

between the colonists and the home land. In consequence of the practical sympathy shown to the West Indies during a period of intense distress, the colonists realize that they are no longer an isolated community, but part and parcel of a vast Empire. Already a considerable number of representatives of Bristol firms have left Avonmouth for Jamaica in search of information and experience likely to prove useful in building up closer trade relations.

The Imperial idea that has of late years taken so prominent a place in national politics is proving of incalculable benefit to this part of the world. The West Indies are sharing in the great British Empire cotton-growing movement. In many directions efforts are being made to stimulate colonial trade. Canada has realized the commercial importance of these islands, and with the view of encouraging intercolonial trade has favoured the West Indies by means of a preferential tariff.

At the present moment, the desirability of fostering trade relations between the Dominion and these islands is receiving considerable attention. There can be no doubt that the recent visit of the Canadian trade delegation will have far-reaching effects in this direction. As will be seen from the reports on pp. 94 and 95, large and enthusiastic meetings have been held in British Guiana and in all the islands visited by the delegation.

Mention might also be made of the important part that has been played in this revival of interest in the West Indies by exhibitions of colonial products. It is entirely on account of the advertisement afforded by these exhibitions that the participation in them of the West Indian Colonies has been so consistently advocated in these columns. Such exhibitions as the Colonial and Indian Exhibition, held at the Crystal Palace in 1905, the periodical shows of colonial fruit held by the Royal Horticultural Society, the shows of colonial products at Liverpool, and the various Canadian exhibitions have had a beneficial effect in making known, in the British and Canadian markets, the varied valuable products of the West Indies. They have resulted in constant and frequent inquiry that is likely to lead to a considerable extension of business relations.

It is the opinion of many who are in a position to judge that the West Indies will secure considerable advantage from the turning on, as it were, of such a search-light of imperial interest, and that this part of the Empire is entering upon a brighter period of commercial existence.





### CITRATE OF LIME IN SICILY.

Upon the representation of the Imperial Commissioner of Agriculture, His Majesty's Consul at Palermo was requested by the Secretary of State for Foreign Affairs to submit a report on the citrate of lime industry in Sicily. Mr. Churchill's report is likely to be of special interest in the West Indies at the present time.

*H. M. Consul for Sicily—to the Right Hon. H. M. Secretary of State for Foreign Affairs.*

Palermo,  
January 25, 1907.

Sir,—I have the honour to submit, herewith, a memorandum of notes which I have already been able to gather regarding the manufacture of citrate of lime in Palermo.

On various occasions, efforts have been made to create combinations in the trade. These have always failed after a short existence. Recently, a new combination was formed in order to improve the condition of the producers. The real object is to endeavour to obtain better prices from the foreign purchaser.

I am continuing to inquire into the manufacture of this product, and if I learn anything further of interest, I shall not fail to lay the matter before you.

I have, etc.,  
(Sgd.) SIDNEY J. A. CHURCHILL.

#### CITRATE OF LIME INDUSTRY OF SICILY.

The lemons in Sicily are produced by grafting the lemon on the bitter orange tree. The lemon is too subject to disease to be good for the production of the lemon used commercially. Concentrated lemon juice is produced by boiling the raw product. This is only done when the juice is exported, and is in order to preserve it from fermentation.

Raw lemon juice is the product of the fruit after it has been passed through the presses. It is generally bought from small peasant proprietors.

The fresh fruit, only the refuse unfit for export as table fruit, is peeled in three pieces. The peel is used in the production of essences and oil of lemon or cedrat oil. The pulp is then placed in baskets made for the purpose, and put under an ordinary wood press with an iron screw, by means of which the juice is extracted. The baskets are then emptied out, and the refuse is used as food for goats—some cows even eat it—or it is employed as a fertilizer. The baskets are taken down to the sea and are there washed out.

The juice is brought to the factory in casks. From these it is poured into a copper trough about 7 feet long by 18 inches wide and deep, pierced with holes which arrest all solid matter. The trough is on a level with the ground in the factory which I visited. Beneath the trough, there is a tank some 2 yards square. The trough lies at the side of this tank. The filtered juice is pumped up from this into a vat where it is mixed with lime.

This vat is wider at the bottom than at the top. Along its sides to about half way there is a serpentine tube carrying hot steam in order to heat the contents of the vat to about 60° C. From the centre to the serpentine there is a board which is actuated by machinery and mixes the contents. Above this vat and on one side of it, there is a smaller vat

which contains the lime. This latter is only loaded to the extent of the acidity required by the trade. For citrate of 5 per cent. acidity, 3,350 grammes of lime are required. The proportion can be calculated out for any acidity required. The mixing with heating lasts some four hours, and is complete when the liquid is thoroughly mixed with the lime. A little milk of lime is required in addition to the lime to complete the operation. This precipitates to the bottom after it has done its work.

From the vat the citrate of lime is run into a shallow tank over which a canvas sheet has been placed to drain the substance. From this tank it is placed into bags which are then put under a hydraulic press in order to remove superfluous liquid. The citrate of lime is then placed on boards in a dry room, where it is dried by heat. This operation is complete in about three days. It is then loaded into casks which have been lined with brown paper, and is ready for export. The liquid drained off the tank subsequent to the mixing and from the bags may contain some acid. It is allowed to flow into the drains here.

The establishment which I went over to-day produces, in the busy season, from 2 to 3 tons a day. The motor is from a 4-horse-power boiler.

Mr. Samuel Hamnet, to whose kindness I owe all these details, was good enough to allow me full access to his works and is ready to show them to any one interested.

I understand that the specifications for Mr. S. Hamnet's plant were drawn up and supplied by Bennett and Jenner, of Abbey Lane, Stratford.

NOTE.—The chalk formerly used in the manufacture of citrate of lime was imported from the United Kingdom; of recent years, however, calcined and ground marble refuse from the province of Venice—being landed in Palermo at cheaper rates—has supplanted the British chalk.

### DEPARTMENT NEWS.

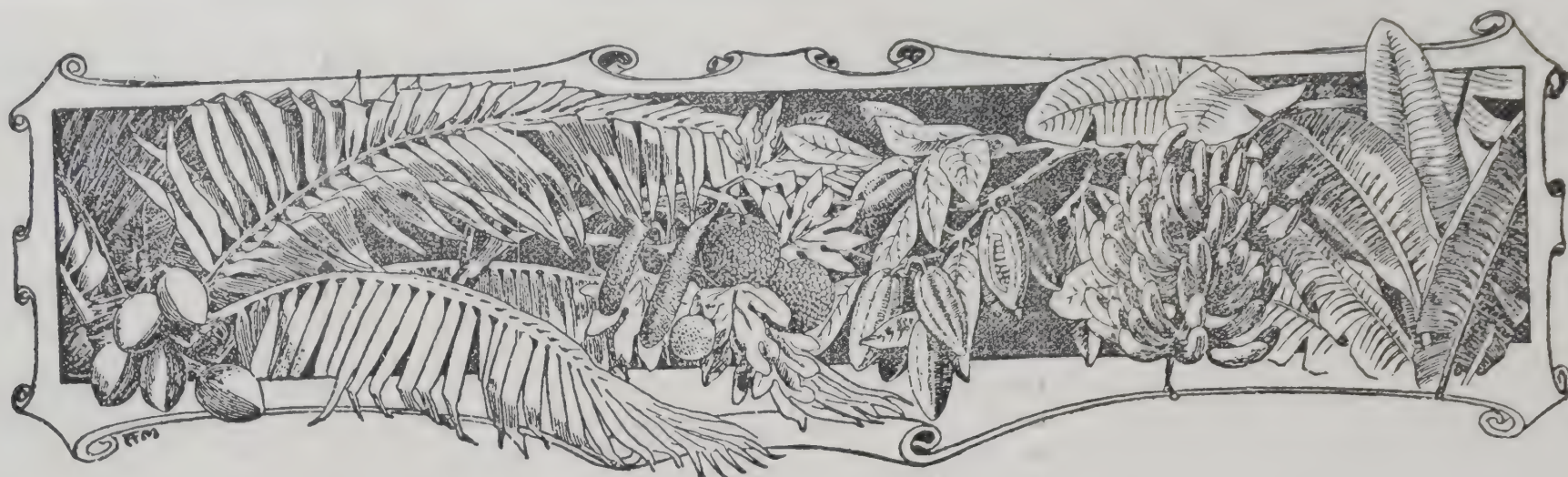
The Imperial Commissioner of Agriculture left Barbados in R.M.S. 'Esk' for St. Vincent on Tuesday, March 12. Sir Daniel Morris returned to Barbados on March 19.

Mr. H. A. Ballou, M.Sc., Entomologist on the staff of the Imperial Department of Agriculture, left Barbados in R.M.S. 'Esk' for Grenada, where he investigated the condition of affairs as to the prevalence of 'thrips' on cacao, the black blight, and other pests. Mr. Ballou returned to Barbados on March 19.

### Podocarpus.

The *Kew Bulletin* (No. 1, 1907) mentions that *Podocarpus milanjiana* found in Uganda produces a timber which seems to be immune to the attacks of termites. On account of this property, it is much sought after by the natives for building. Several species of *Podocarpus*, some of them large trees over 100 feet high, are found in the mountain forests of the West India Islands. The fruit of these conifers is readily recognizable on account of the red pulpy part, due to the swelling of the stalk below the seed, and hence it somewhat resembles a miniature cashew fruit. It would be of interest to learn whether their timber is also unattacked by termites, since, if such were the case, it would be of great utility for house building in many West India localities. The *Podocarpus* trees at Jamaica are known as 'yacca.'





## WEST INDIAN FRUIT.

### WEST INDIAN ORANGE INDUSTRY.

The following is a copy of a letter addressed by Dr. H. A. Alford Nicholls, President of the Dominica Agricultural Society, to Mr. G. W. Penrice, the Society's representative at the recent West Indian Agricultural Conference. It refers to matters relating to the orange industry which were proposed to be discussed at the Conference :—

Dominica,  
December 18, 1906.

Sir,—The following facts connected with the West Indian orange industry are of sufficient importance to engage the attention of the Agricultural Conference, and I hope you will be able to take the necessary steps to secure a full discussion on them.

2. As you are aware, some years ago a great advance was made in the prosecution of the industry in this island by the extensive planting of budded Washington Navel and other fine varieties of oranges. Mr. Hesketh Bell, the then Administrator, and his brother-in-law, Mr. J. F. Scully, planted budded oranges in large numbers on their estates, and other proprietors followed their lead in the matter.

3. The Imperial Department of Agriculture assisted greatly this new planting enterprise by publishing in pamphlet form the paper read by Mr. Hesketh Bell before our Society on Orange Cultivation in Dominica, and by making proper provision at the Botanic Station for the continuous supply of budded plants, and the result was that many thousands of Washington Navel orange trees have been established in the island.

4. This year considerable shipments of the fruit were made to the London market, and the brokers reported on them as follows : 'The oranges were very nice indeed and nicely packed.' So that the conditions necessary for planters to secure success had been fulfilled ; but, unfortunately, the prices proved unsatisfactory, because the market was flooded with shipments of about 30,000 boxes of Jamaica oranges, many of which were reported to be 'selling at prices which do not even cover the freight.'

5. Now this state of affairs must be as unsatisfactory to Jamaica shippers as it is to Dominica ones, and it will be of very great benefit to so important a West Indian industry, if measures can be devised to prevent the total loss to growers that results from their fruit being sold at prices that do not even cover freight.

6. It has been suggested that Jamaica shippers should take the matter into their own hands and prevent their fruit

being sold on the market for less than a minimum remunerative price. As Jamaica practically holds a monopoly of the London orange market during the months of August, September, and October, it is in a position to dictate its own terms. It is a question between sellers and buyers ; and, should buyers refuse to pay the minimum remunerative price fixed, then the fruit might be given away to the hospitals and other charitable institutions, or be disposed of otherwise.

7. The loss of a few shipments in this way would show buyers that the growers were in earnest, and the loss would be made up before long by the healthier trade relations that would result from such action.

8. I would ask you to submit this letter to Sir Daniel Morris, and to obtain his permission for it to be laid before the Conference. If this be done, and a committee be appointed to consider the question, an amelioration of the present unsatisfactory state of affairs may be brought about by combined action in their own interests on the part of the shippers.

I have, etc.,  
(Sgd.) H. A. ALFORD NICHOLLS.

### PACKING ORANGES.

The *Natal Agricultural Journal*, for December 1906, contains the following directions as to packing oranges for export :—

- (1) Pick only fully developed, but not fully ripe fruit.
- (2) Cut the fruit from the trees ; do not pull it.
- (3) Avoid all bruising ; a bruised fruit is unfit for export.
- (4) Sweat the fruit by allowing it to remain in the picking-boxes for a few days.
- (5) Grade the fruit for quality, excluding all blemished, marked, scaly, or imperfect fruits.
- (6) Wrap each fruit in soft, tough paper, stamped with the grower's brand.
- (7) A single undersized or inferior fruit will spoil the sale of a case, or even sometimes of the whole shipment of the same brand.
- (8) The fruit should be packed tightly enough to prevent it shifting, but not so tightly as to bruise it.
- (9) The cases should be made of quite dry wood, with cleats on one side to allow for ventilation when the cases are stacked. They should be lined with strong white paper.
- (10) Each case should be distinctly branded with the quality of the fruit and the grower's mark.
- (11) The cases should be handled carefully when shipping, or the fruit may be badly bruised.



### BANANAS IN COSTA RICA.

The following is an abstract of an article in *L'Agriculture pratique des pays chauds*, for October 1906, based on reports of the French Consul at Costa Rica:—

Costa Rica produces more bananas than any other country in the world. Scarcely twenty years ago the east coast of Costa Rica was unproductive, without communication, and almost uninhabited. To-day, owing to the operations of the United Fruit Company, there are more than 10,000 labourers at work, nearly all from Jamaica. They are cultivating plantations which comprise about 50,000 acres of bananas, all connected by railways with the port of Limon. This port, which was almost unknown a short while ago, is now one of the most important in Central America. At present three or four steamers, carrying 20,000 to 30,000 bunches of bananas each, leave Limon each week for New York (seven days) or New Orleans (five days). Costa Rican bananas are sold in the United States at about 2s. 6d. to 3s. a bunch. In 1904, Costa Rica exported 6,065,400 bunches.

Messrs. Elders & Fyffes, Ltd., run a direct weekly banana steamer between Limon and Manchester. The voyage takes seventeen days. Up to April 1904, 991,505 bunches of Costa Rican bananas had been carried to Manchester. The company paid about 1s. per bunch, on the average, and the bunches were sold in England at 7s. to 8s. each.

The immense fields of bananas in the neighbourhood of Limon are cultivated with the plough, etc., and kept as clean as a garden. Alluvial soils, rich in humus, near a river so as to be damp without being swampy, with abundant rain and shelter from wind, grow the best bananas. The plantations extend inland about 25 miles from the coast, and are not at a greater elevation than about 600 feet. Each plantation must be near the railway or other means of rapid transport. According to its favourable position or otherwise, the cost of an acre of land in forest in Costa Rica may vary from 2s. 6d. to about £5. An acre in bananas will produce, on the average, twelve bunches each month. These are paid for on delivery at the railway station at about 1s. each. Each bunch costs, it is calculated, about 4d. for cultivation, cutting, and carrying to the station. Hence an acre will give a profit of £4 16s. a year. The usual duration of a plantation on the same land is from seven to ten years.

### RUBBER IN SIERRA LEONE.

The following is extracted from the *Annual Colonial Report* on Sierra Leone, for 1905:—

The trade in rubber has largely increased during the year, the quantity exported being the largest for the past five years; it exceeds by nearly 300 per cent. the amount shipped in 1904. Of this increase a large proportion was 'root rubber.' The expression 'root rubber' means rubber obtained by cutting up a vine or its roots into short lengths and boiling the cut fragments. Our knowledge is not complete with respect to the number of species of rubber-yielding vines, nor to their properties, nor to the processes by which the rubber can best be extracted from the respective species. While it is known that, under favourable conditions, the latex can be obtained copiously from some vines, there is reason to suppose that it cannot be made to flow freely from other vines. If this latter supposition is found to be correct, it necessarily follows that it would be a mistake to prohibit the export of the so-called 'root rubber,' especially as some fragments of the roots always remain in the soil, and, consequently, no danger exists of the plants becoming exterminated.

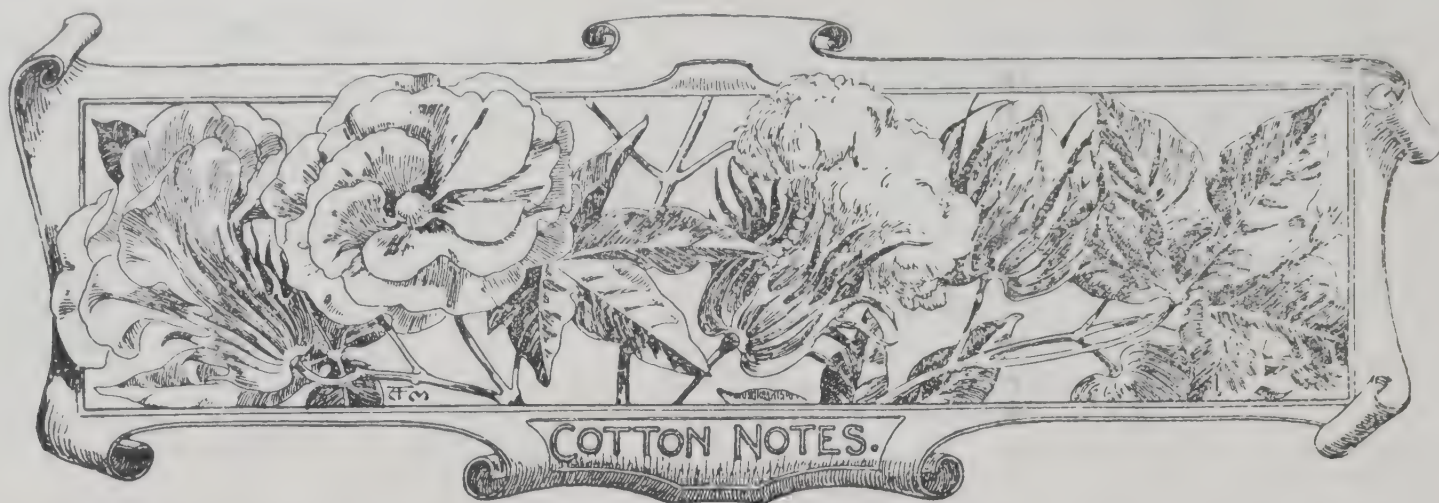
### TOBACCO CULTIVATION IN SUMATRA.

The following is an abstract of a lecture on tobacco cultivation in Sumatra, delivered by Mr. M. Kelway Bamber at the Ceylon Rubber Exhibition, 1906:—

The large tobacco estates are cultivated by Chinese coolies, whose care and patience in such agricultural operations are probably unequalled. The fields are thoroughly prepared and levelled like a smooth garden. In the nurseries equal if not more care is given. Day and night the leaves of the seedlings are searched for caterpillars, etc. Every six days new nursery beds are made in succession. They are shaded for about a month. In six weeks from the sowing of the seed, the seedlings are ready to be transplanted. Transplanting goes on from March to June. The plants are pulled up early in the morning, while wet with dew. Only the healthiest and greenest are taken. They are kept covered in baskets until evening, when they are planted firmly in previously prepared and watered holes. The same night shade planks are fixed over every plant, so that they get only the early morning sun. These planks are gradually turned up and finally removed two weeks or so after planting. The soil is then heaped round each plant. The land is hoed three times and the plants are gradually and carefully earthed up. This should be completed before the leaves commence to ripen or they lose in quality. If the weather is dry after planting, each plant is watered with clean water. When about a foot high the bottom leaves are removed, placed round the earthed-up roots, and covered with soil. The third and last cultivation takes place when the plants are about 2 feet high, and then the rows stand on fairly high ridges. When the plants have been transplanted for a month and a half, the first flower-buds are pinched off. Suckers also have to be continually pinched. Rather fewer than twenty leaves are left on each plant. The leaves are usually ripe three weeks after topping, when they are yellowish and their edges become brown and curl down. The time from transplanting to harvesting is seventy to ninety days. The leaves are picked as they arrive at the correct stage of ripeness, but never when wet with dew or rain. They are carried to the drying shed in baskets.

The leaves are strung and hung on slats. They are hung at the top of the shed, which is filled from above downwards. Care is taken that no green tobacco is hung beneath partially cured tobacco. Therefore, when the first leaves are partially dried, they are gradually lowered, the next day's leaves being placed above them. All the doors and windows are completely closed during the night. About nine in the morning, if the air is more or less dry, the doors and windows are opened, a little at first. If too much light or air is allowed when the leaves are green, the rich brown colour essential for the Sumatra leaf will not appear. In windy weather the sheds are closed. The leaves are sufficiently dry when they contain 20 to 25 per cent. of moisture. They are sorted into four grades, tied up in bundles of fifty each, and taken to the fermenting sheds in baskets. Much of the value of Sumatra tobacco depends on never-ceasing care during the whole period of production, especially in fermenting, sorting, and grading. When a dark-coloured tobacco is required, the temperature of the fermenting heap is allowed to rise more rapidly and to a rather higher point. When a light-coloured leaf is desired, the temperature is kept at or below 100° F. When fermented, the leaves are sorted by experienced Chinese and Javanese coolies, and graded according to length, appearance, and texture. This is a most important process in order to ensure even bales.





### WEST INDIAN COTTON.

Messrs. Wolstenholme & Holland, of Liverpool, write as follows, under date of February 25, 1907, in regard to West Indian Sea Island cotton:—

West Indian Sea Islands, since our last report, have been in good request, and considerable sales have been made, including St. Kitt's, Barbados, and Montserrat, at 23*d.* to 26*d.*, and some superfine St. Vincent cotton has been sold on private terms. The total sales will reach about 500 bales.

### SEA ISLAND COTTON IN THE BAHAMAS.

The *Bulletin of the Agricultural Department*, Bahamas, for January, contains an account of experiments with Sea Island cotton:—

Two plots of Sea Island cotton, one on black and the other on red soil, were planted at the Experiment Station on July 31, 1906. The seed was obtained from the Imperial Department of Agriculture for the West Indies. After one picking the plants were pruned in December to test the quality of cotton from the second crop. They were not attacked by any insect or other pests, and their growth was fairly luxuriant. The amount of seed-cotton from the plot on red soil was equivalent to 396 lb. per acre. Samples of the cotton were sent to the British Cotton-growing Association. The first sample was valued last December at 1*s.* 11*d.* to 2*s.* per lb., and was described as 'clean, very bright, staple extra fine, and long.'

### INSURANCE OF COTTON SHIPMENTS.

With reference to the insurance of shipments of cotton from the West Indies, of which mention has previously been made in the *Agricultural News* (Vol. V, p. 390, and Vol. VI, p. 6), the following communication has been addressed by the Secretary of the British Cotton-growing Association to the Imperial Commissioner of Agriculture:—

We have been in further communication with the Marine Insurance Co., who now inform us that our cover does *not* include risk of country damage, or damage sustained by the cotton whilst in course of transit from the plantations to the ports of shipment, but, as we have previously advised you, *does* include risk of fire whilst the cotton is awaiting shipment in the steamship companies' (not planters') warehouses at the ports of origin in the islands comprehended by our cover, viz., Barbados, Montserrat, Nevis, Antigua, St. Vincent, St. Kitt's, Anguilla, and St. Croix, not exceeding thirty days, and also for thirty days when the cotton has to be transhipped to the ocean-going steamer.

We may say that cotton is only held covered when

shipped by steamers *owned* by the Royal Mail Steam Packet Company, or Messrs. Scrutton, Sons & Co. (the Direct Line); but if a consignment is made by a steamer chartered by either of these companies, for the voyage in question only, the Insurance Company will cover same, but an additional premium will be charged at the rate of  $\frac{1}{8}$  or 2*s.* 6*d.* per cent. In this case the consignor of the cotton should bring same to our notice in his letter of advice, so that no confusion may subsequently arise as to the rate of premium charged on his shipment. The Marine Insurance Company, however, reserve the right to make a higher additional charge than  $\frac{1}{8}$  per cent., if the steamer chartered is of an inferior type.

The whole question of insurance is being gone into by Mr. Hutton, and if we can arrange a more inclusive policy we shall do so, and whatever is done we will immediately advise you.

### SHEDDING OF COTTON BOLLS.

Many planters have observed that the 'shedding' of bolls is very frequently a source of great loss to the cotton crop, and in some instances the trouble has been attributed either to the work of insects or to the action of a fungus.

Some of the shedding may be due to these causes, but it is more than probable that it is largely a physiological trouble, for it occurs most frequently in extremes of either dry or wet weather, or during the change from one extreme to the opposite extreme. It may occur under normal climatic conditions if the cotton plants have been planted too closely together; and, sometimes, conditions during the beginning of the season are very favourable to the production of a large number of young bolls, while, later, the season becomes more normal, and the plant is unable to mature all of them.

Professor Atkinson, in a bulletin entitled 'Some Diseases of Cotton,' states that he found this physiological form of shedding to be far more serious than that produced by other causes, and explains that it is due to an interference with the supply of nutrient materials or moisture from the soil, which may be sufficient not only to stop the growth of tissue in the young boll, but also to deprive it of much of its accustomed moisture; with the result that the tissues of the young fruit are forced into an unnatural condition. The fruit, including the fruit-stalk and some of the surface tissue of the stem at its point of attachment, becomes paler green in colour, so that a well-marked colour-line marks off the healthy from the unhealthy portion, and later the tissue is separated at this line, so that the fruit falls off completely.

Whether all cotton plants participate in this shedding of bolls to an equal extent has yet to be inquired into, for it may be a factor of some importance in the selection of plants to produce varieties that are better able to withstand sudden changes in their normal nutrition.



## 'MALE' OR SEEDLESS COCOA-NUTS.

In November 1906, Mr. A. W. Bartlett, B.A., B.Sc., F.L.S., Government Botanist of British Guiana, forwarded to the Imperial Department of Agriculture a number of cocoa-nuts in which the hard nut was more or less completely suppressed, so that they were little more than husk. He wrote as follows:—

It appears that there are certain trees, though they are rare, which bear only this kind of nut. A more usual occurrence is for individual trees to bear some of these 'man cocoa-nuts' mixed with the ordinary kinds on the same bunch. I have sent a branch to illustrate this, which, you will observe, is bearing three of the good nuts and two of the bad ones.

The rest of the cocoa-nuts in the bag, except a half-one, have come from a tree which is said to bear no good nuts; but two of the nuts when split open show a partial development of kernel in the apical half, so there would appear to be various degrees of sterility. Most of the 'man cocoa-nuts' when cut open show a conical hollow where the nut should

be, but the half-nut already mentioned consists entirely of husk and exhibits no such cavity.

So far as I can learn, the partial production of 'man cocoa-nuts' would seem to be limited to certain trees, i.e., on these trees one would always expect to find a certain proportion, but it would be very rare for an individual specimen to occur on ordinary trees. These trees are by no means uncommon in this colony.

One correspondent informs me that the parent of a palm, which

bore partly 'man cocoa-nuts,' itself possessed the same peculiarity. This is a fact of some importance because it shows that this partial sterility is a character which may be hereditary and capable of transmission by the seeds. Hence, in planting cocoa-nuts one would have carefully to avoid planting any nuts from these trees. In the case of the palms bearing only sterile nuts, there would be no chance of propagating this undesirable character, except possibly by the pollen from the male flowers, if these trees have any, or if the pollen is fertile.

These 'man cocoa-nuts' would appear to be a parallel case with the seedless lime and other seedless fruits which horticulturists have obtained.

I shall be glad if you will kindly inform me as to

whether the occurrence of these 'man cocoa-nuts' has been recorded from any of the West India Islands; and if so, whether they are common and whether any cause has been assigned for their production.

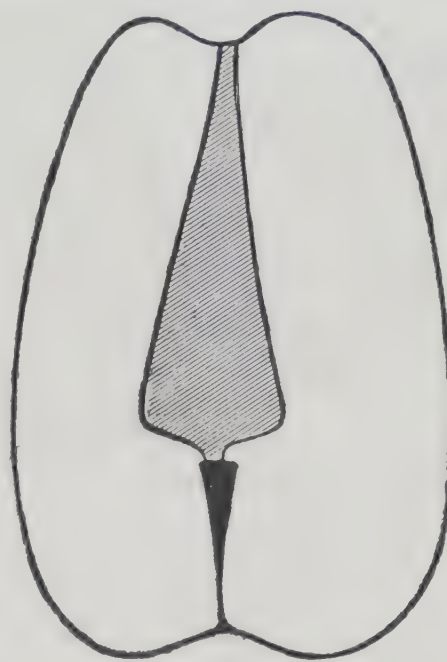


FIG. 6.

The following notes on the examination of these specimens have been made by Mr. John Belling, B.Sc., from whose drawings the accompanying figures have been made:—

The seedless cocoa-nuts may be distinguished from the perfect ones, found sometimes on the same bunch, by being narrower.

Instead of a seed enclosed in a strong shell, they have a smaller or larger

piece of brown shell-substance with three wing-like extensions, apparently representing the three ridges of the perfect shell. Behind this is a larger or smaller cavity with smooth walls.

(Figs. 6 and 7.) In two specimens a diminutive nut was found occupying the position of this piece of shell-substance, with a conical cavity behind. (Fig. 5.)

In the perfect cocoa-nut there is no trace of any such cavity between stem and shell. (Fig. 4.)

The following notes will explain the figures of longitudinal sections illustrating the abortion of the seed:—

Figs. 4 and 7 were taken from fresh, and figs. 5 and 6 from dry nuts. The stem end is below. Fig. 4 shows a perfect nut (from the same bunch as fig. 7).

Fig. 5 shows a small nut with a conical cavity below. Fig. 6 shows a winged piece of shell-substance (black) and a large conical cavity below. This is the most common form on the barren palms. Fig. 7 shows only a narrow piece of shell-substance and a diminutive cavity below.



FIG. 7.

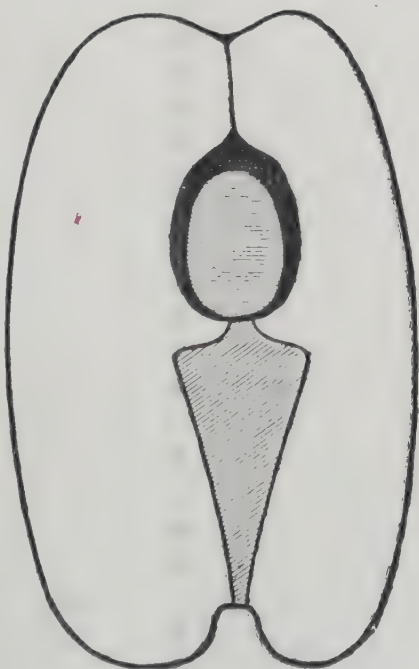


FIG. 5.

**The Bead Tree of India.** (*Elaeocarpus Ganitrus*) is now fruiting in the Botanic Station, Dominica. It is a large tree, and bears numerous racemes of small, white flowers, followed by a profusion of spherical fruits, blue in colour when ripe, and about an inch in diameter. The pulp surrounding the stone is eaten by children. The hard nut is much sought after, as it is regarded as a lucky seed. In India the hard stones of the fruit are used for making rosaries, necklaces, bracelets, etc. A few plants of this interesting tree are now available for distribution at the station. Owing to the extreme hardness of the stone, it is somewhat difficult to raise plants, as the seeds take about a year to germinate.



## EDITORIAL NOTICES.

Letters and matter for publication, as well as all specimens for naming, should be addressed to the Commissioner, Imperial Department of Agriculture, Barbados.

All applications for copies of the 'Agricultural News' should be addressed to the Agents, and not to the Department.

*Local Agents:* Messrs. Bowen & Sons, Bridgetown, Barbados. *London Agents:* Messrs. Dulau & Co., 37, Soho Square, W., and The West India Committee, 15, Seething Lane, E.C. A complete list of Agents will be found on page 3 of the cover.

The *Agricultural News*: Price 1d. per number, post free 2d. Annual subscription payable to Agents, 2s. 2d. Post free, 4s. 4d.

## Agricultural News

VOL. VI. SATURDAY, MARCH 23, 1907. No. 128.

### NOTES AND COMMENTS.

#### Contents of Present Issue.

Reference is made in the editorial to the welcome manifestations of a revival of interest abroad in West Indian affairs.

His Majesty's Consul at Palermo has reported upon the citrate of lime industry in Sicily. Mr. Churchill's report contains information likely to be useful to lime growers in the West Indies (p. 83).

The position of West Indian oranges in the London market is referred to on p. 84.

The attention of cotton growers is directed to the extract from a letter from the British Cotton-growing Association on the subject of the insurance of cotton shipments (p. 86).

Cocoa-nut trees sometimes bear fruits in which the seed is wholly or partially aborted. These are known as 'male' or 'man' cocoa-nuts. This condition is dealt with in an illustrated article on p. 87.

The note on toads and frogs (p. 90) explains the chief differences in form and habits between these two animals.

A successful Agricultural Show was held at Antigua under the auspices of the Imperial Department of Agriculture and the Agricultural and Commercial Society on February 28 (p. 91).

The movements of the Canadian Trade Delegation to the West Indies are recorded on pp. 94 and 95.

#### Marine Fauna of Barbados.

Dr. Robert Hartmeyer, of the Berlin Zoological Museum, and Professor Dr. W. Kükenthal, Director of the Zoological Institute of the University of Breslau, are visiting the West Indies for the purpose of examining the marine fauna.

In Barbados, they took up their quarters at the St. Lawrence Hotel, and collected marine invertebrates on the adjoining reefs, also dredging in the shallow waters beyond. They stated that on the leeward shores, especially off Hastings and the Stream, there were excellent collecting grounds for the lower forms of the marine fauna for museum and teaching purposes.

From Barbados these two distinguished scientists have gone to Trinidad.

#### Manuring Cacao in Grenada.

In a recent report the Agricultural Superintendent at Grenada mentions that basic slag is a very popular fertilizer for cacao throughout the island, where the clay soils undoubtedly respond to it, largely in consequence, probably, of the free lime present in this fertilizer. Mr. Anstead is of opinion that there is a tendency to depend too much upon this, and to neglect the requirements of the soil in respect of humus. As a measure of economy, he is advising planters to apply lime to the soil, follow with pen manure, and finally use basic slag in smaller proportions.

It may be of interest to mention that the owner of the Grand Roy experiment plot states that two-thirds of the total yield from the 5 acres of cacao he owns, were reaped from the experiment plot, which is 1 acre in extent.

#### Distance of planting Para Rubber Trees.

The *Handbook of the Ceylon Rubber Exhibition, 1906*, discusses this important point. Years ago, the Ceylon Botanical Department, basing its opinion on an accepted axiom of forestry, planted rubber trees 10 feet by 10 feet, or 12 feet by 12 feet. The object was to get tall, straight boles. It was intended to thin the trees out subsequently to 20 feet by 20 feet or some such distance. But it was found that a planter was not willing, after he had 300 trees growing on an acre, to thin out and admit he had only 150. Also, when they began cutting down trees, the stumps were attacked by the root fungus, *Fomes semitostus*, which spread to the uncut trees. Besides, trees up to five years old contain but little rubber in their latex, and it does not seem probable that it would pay to uproot four-year-old trees and extract the rubber by maceration. By close planting, too, if thinning were carried out at four years, the remainder of the trees would be about a year in growth behind trees which were planted from the first at wide distances.

Hence the factor in valuing a plantation of rubber would not be the number of trees, but the number of acres. A good average distance, which, however, would vary according to the character of the soil, would be 20 feet by 15 feet. This would give about 150 trees to the acre.



### Sugar Industry Agricultural Bank at Barbados.

The desirable aim of developing a system of agricultural credit in the West Indian Colonies has taken concrete form in the Sugar Industry Agricultural Bank established in Barbados by the Act of February 20, 1907.

By the provisions of this Act, the free grant of £80,000 from the Imperial Parliament in aid of the sugar industry in Barbados, from which advances have hitherto been made to planters at 6 per cent. interest for the last five years, is transferred to an Agricultural Bank. The Directorate will consist of the Colonial Secretary (Chairman), one member elected by the Legislative Council, four members elected by the House of Assembly, and one by the Agricultural Society. A suitable staff will be appointed and yearly audits arranged for.

The consent of mortgagees, or due publication of intention to borrow, is required of owners applying for loans. The application of the loan is, except with the express permission of the Bank, limited to the general cultivation and management of the plantation. The loans will be a first lien against plantations, except liens resulting from certain previous Loan Acts in certain cases. The agricultural year is defined as from June 1 to May 31 in the year following. Loans previous to the beginning of any agricultural year can only be expended in artificial manures and the payment of taxes.

The accounts of the estate must be presented to the bank each quarter. The sugar, molasses, and cotton crops, on which a loan has been made, are to be sold in the island and the amount of the loan repaid, with the interest, from the proceeds. The Bank is empowered to insure buildings, crops, etc., from fire, at the charge of the estate. Any sum due on account of a loan, after payment of the proceeds of the sale of the crops, is to be repaid in five annual instalments, with annual interest, commencing on August 1 of the next following year.

### A. B. C. of Cotton Planting.

The *A. B. C. of Cotton Planting* was first issued by the Imperial Department of Agriculture in June 1904. It was accorded an excellent reception, being found to contain valuable information, simply worded, and suited to the requirements of the West Indies. So great was the demand for this pamphlet that it had twice to be reprinted.

Experience gained in growing cotton in the West Indies during the past three years has suggested many points on which additional hints and suggestions are necessary. These are now embodied in a new edition, which has been thoroughly revised, the information being brought up to date. The number of pages has been increased from sixty to ninety-eight, and several new illustrations showing the cotton aphid, lady-birds and their larvae, the lace-wing fly, etc., have been inserted.

Additional information has been given as to the manuring of cotton, the best time for planting, the most

suitable distances, the picking of cotton, and the application of Paris green. The various pests to which Sea Island cotton is liable in the West Indies have been treated in much greater detail, while space is devoted to such important subjects as the selection and disinfection of cotton seed for planting purposes and the use of cotton-cake-meal as a feeding stuff on West Indian plantations.

This new edition (No. 45 of the Pamphlet series) can be obtained of all agents for the sale of the publications of the Department; price 6d., post free 7½d. All growers of Sea Island cotton in these islands are strongly urged to make themselves thoroughly familiar with its contents.

### West Indian Bulletin.

The latest issue of the *West Indian Bulletin* (Vol. VII, no. 4) contains an important article by Sir Henry M. Jackson, K.C.M.G., on the share system in cane cultivation, as adopted in Fiji, Mauritius, and Hawaii. In the two former colonies the system has been most successful in retaining the services of a large number of coolies after the lapse of their indentures, and in Hawaii it has proved quite satisfactory with the Japanese labourers. This method would appear to offer a fair promise of solving some of the difficulties connected with the labour supply on sugar estates in Trinidad and British Guiana.

There is also a comprehensive paper by Sir Daniel Morris, K.C.M.G., and Mr. F. A. Stockdale, B.A., on the 'Improvement of the Sugar-cane by Selection and Hybridization,' illustrated by six coloured figures of notable sugar-canes. Some of its contents are: bud variations or sports; foreign varieties; history of seedling canes; description of sugar-cane flower; hybridization; classification of canes; while an account is given of the work that has already been done on the improvement of the sugar-cane in different countries.

Mr. W. R. Buttenshaw, M.A., B.Sc., contributes an article on the distribution of economic plants by the Botanic Stations in the West Indies. Considerably more than half a million seedlings, etc., of the various economic trees and shrubs have been distributed during the last five years, as well as great numbers of cuttings of superior varieties of sugar-cane, cassava, and sweet potato, and also quantities of seed. The Botanic Station at Dominica, under Mr. J. Jones, has been most successful in this respect.

Professor A. Nalepa, of Vienna, the world's expert on those destructive arachnoids, the gall-mites and leaf blister-mites, has written in German on various West Indian and Fijian mites. A translation of these papers forms the last article in this number of the *West Indian Bulletin*.

Interesting papers on manurial experiments with cacao, citrate of lime, agricultural credit, and kola are also included.

The number is on sale by all agents for the sale of the publications of the Department, price 6d., post free 8d.





## INSECT NOTES.

### Tree Borers.

An article appeared in the *Agricultural News* early last year (Vol. V, p. 154), in which two tree borers were mentioned. One of these was called *Chlorida festiva*, but the other had not then been identified. Dr. Henry Skinner, Curator of the Entomological Division of the Academy of Natural Sciences, Philadelphia, has since kindly identified this insect, and he writes as follows: 'The insect you sent me belongs to the family of the Coleoptera Lymexylonidae, and is *Atractocerus brasiliensis*, Serv.'

Of this family, Dr. Sharp, in the *Cambridge Natural History*, (Insects), Part II, p. 254, states:—

Although there are only twenty or thirty species of this family, they occur in most parts of the world, and are remarkable on account of their habit of drilling cylindrical holes in hard wood, after the manner of Anobiidae. The larva of *Lymexylon navale* was formerly very injurious to timber used for constructing ships, but of late years its ravages appear to have been of little importance. The genus *Atractocerus* consists of a few species of very abnormal Coleoptera, the body being elongate and vermiform, the elytra reduced to small, functionless appendages, while the wings are ample, not folded, but traversed by strong longitudinal nervures, and with only one or two transverse nervures. Owing to the destruction of our forests, the two British Lymexylonidae—*L. navale* and *Hylecoetus dermestoides*—are now very rarely met with.

### Quarantine Work in Hawaii.

In the last issue of the *Agricultural News* (p. 74), mention was made of several insect pests which were found to have been imported into Hawaii with sugarcane cuttings from different parts of the world; these cuttings were fumigated or destroyed by direction of the entomological staff of the territorial Board of Agriculture.

Similarly, a consignment of 1,415 young cocoa-nut trees for sale, from Palmyra, was found on examination to be so infested with the cocoa-nut palm worm (*Omiodes Blackburnii*) that the trees had to be destroyed by fire.

Five packages of mango grafts from Florida were destroyed by fire in consequence of the presence of a number of scale insects. Orange growers in Hawaii are advised against the importation of citrus trees from Florida or Louisiana.

During November and December various consignments of citrus fruits arrived from Japan and China, aggregating 2,950 cases, which were seriously infested with injurious insects and diseases. The fruit and cases were all destroyed by burning. One hundred and fifty orange trees from Japan were burned; also numbers of other trees and plants from the mainland and other parts which were infested with destructive pests and diseases.

## TOADS AND FROGS.

Toads and frogs are tailless amphibians. They are a little higher in the animal kingdom than the fishes, in that they do not breathe by gills all through their lives, the adults being possessed of lungs.

Most of the amphibians, however, are true water animals for a portion of their lives, breathing by gills, and swimming by means of a tail, which, in the tailless amphibians (Anoura), is lost in metamorphosis, and is not present in the adult.

The toads belong to the family Bufonidae, and the frogs to the Ranidae. The former have no teeth in their jaws. The skin is rough and granulated, the hind limbs are not abnormally developed, the toes are only imperfectly webbed, while the toes of the fore feet are always free. The toad catches its prey only when moving. The tongue is thrown forward, the insect or other small animal being picked up and quickly transferred to the throat.

The common toad of England is *Bufo vulgaris*; of North America, *Bufo lentiginosus*; and of the West Indies, *Bufo aqua*.

The frogs differ from the toads in having teeth on the upper jaw, and generally the hind legs are enormously developed for jumping, the toes of these limbs being always webbed. The tongue of the frog is attached in front and free behind, as in the toad, with the difference that the tongue of the frog is forked at the tip, while that of the toad is not.

Frogs rarely possess any noxious qualities, while the toads, as stated in the *Agricultural News*, Vol. III, p. 362, secrete in glands of the skin an acrid fluid. The West Indian toad (*Bufo aqua*) is said to secrete this venom in parotid glands also.

The eggs of these animals are generally deposited in water, those of the frog embedded in irregular, gelatinous masses, and of the toad in two strings or chains of gelatinous matter. The eggs of the tree frog or whistling frog (*Hylodes martinicensis*), so common in the West Indies, are laid in moist situations, such as under stones, flower-pots, etc.

Both toads and frogs are useful to the agriculturist on account of their habit of eating insects and other small forms of animal life; recently, in the *Agricultural News*, Vol. VI, p. 20, observations were given as to the feeding habits of the common toad, mention being made of its fondness for cotton worms; it is also said to eat mice and young rats.

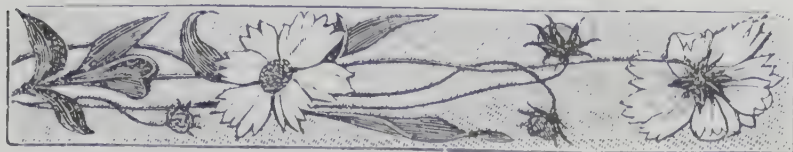
The edible frog or 'mountain chicken,' known in Dominica and St. Kitt's as the 'crapaud,' is one of the larger frogs, and is a species of the genus *Rana*.

The local name 'crapaud' is also given in Barbados and in some of the other islands to the toad.

## INTRODUCED BIRDS IN AUSTRALIA.

The Assistant Government Entomologist mentions in the *Victoria Journal of Agriculture* that some introduced birds have become very destructive, often changing their previous habits. The English starling is a most pernicious enemy to the fruit grower or viticulturist in Victoria and other Australian States. These birds are increasing much more rapidly than their natural food. They destroy peaches, pears, cherries, apricots, grapes, apples, tomatoes, etc. The English blackbird was regarded as insectivorous, but since its introduction it has taken to eating fruit. Around Melbourne it is difficult to get ripe figs, grapes, or peaches on account of the depredations of the introduced blackbird and thrush. The house sparrow eats the wheat when it is sown and after it is ripe, and is a pest to every farmer. The Indian minah is another introduced bird which has become destructive. In this connexion reference may be made to an article on 'Insectivorous Birds' in the *West Indian Bulletin*, Vol. II, pp. 243-5.





### ANTIGUA AGRICULTURAL SHOW.

The Antigua Agricultural Show was held on Thursday, February 28, in the grounds of Buxton Grove.

The show was opened at 12 noon by his Excellency Sir E. B. Sweet-Escott, K.C.M.G., who, in his opening speech, alluded to the number and quality of the exhibits, and to the work of the Imperial Department of Agriculture and the Agricultural and Commercial Society.

In number the exhibits fell short of those shown last year, although exceeding those of 1905; in quality the exhibits varied considerably. Among the stock, the horses showed marked improvement over last year's exhibition; on the other hand, the classes for mules and oxen were somewhat below the average, with the exception of the locally raised mules, which continue to hold out good promise for the future of a local mule-raising industry. In the classes for smaller stock the exhibits were also somewhat poor; the poultry, on the other hand, were very good.

The exhibit of fruit and vegetables, which was such a feature of the previous exhibitions, showed this year a falling off as regards quality, a result attributable to the unwonted weather conditions which prevailed during the five months immediately preceding the show. Mention must, however, be made of the exhibits of limes and lemons which were unusually good. The cane exhibits were somewhat scanty, but the cotton exhibits were excellent, both as regards quality of cotton and preparation, though in number there was again a slight falling off as compared with the previous year.

Among minor products the meals and starches were, as usual, excellent. A class which attracted considerable interest was one for native-made brooms from broom corn, which was included among the classes for the first time this year.

The school exhibits were again deserving of great praise, being better, if possible, than last year.

The Imperial Department of Agriculture was, as usual, represented by a special exhibit. This included specimens of vegetables and other products grown at the Experiment Stations, a number of diagrams showing the composition and comparative values of various fodders and manures, specimens of fermenting muscovado sugars, and diagrams representing the harmful action of the organisms occasioning the process. An exhibit of Columbian cassavas, which contain practically no prussic acid, was also shown, together with diagrams comparing the amounts of prussic acid contained by them as against ordinary West Indian bitter and sweet cassavas.

The advantage of disinfecting cotton seed was well shown by two seed testers containing germinating cotton seed, of which one contained seed that had not been treated in any way, and the other seed that had been disinfected with a 1 in 1,000 solution of corrosive sublimate; the untreated seed showed a profuse growth of moulds, while the treated seed showed little or no such growth. The method of preparing Bordeaux mixture—the use of which for treating cane plants is extending in Antigua—was shown, together with properly and improperly prepared mixtures.

In relation to cotton, there were exhibited specimens of different varieties and hybrids raised at the Experiment Station, diagrams of the cotton exports from the Leeward Islands during the past three years, a frame containing combed staples of various typical varieties of cotton, and also a small frame showing the improvement effected in West Indian Sea Island cotton between 1903 and 1907.

A large diagram illustrated the characters and mode of attack of the cotton boll worm, which has recently occurred as a cotton pest in Antigua and Barbuda.

Specimens were shown of various arsenical insecticides, which might serve as substitutes for Paris green in combating the attacks of the cotton worm.

At intervals during the day demonstrations were given, by members of the staff of the department, of simple methods of judging the quality of Sea Island cotton lint.

On the whole, the show was a successful one, although the number of exhibits showed a slight falling off.

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### CYCLONIC DISTURBANCE NORTH OF ANTIGUA.

In the *West Indian Bulletin*, Vol. VII, pp. 257-9, there was published a memorandum by Mr. H. A. Tempany, B.Sc., F.I.C., F.C.S., describing the meteorological conditions observed at Antigua during the passing of the cyclonic disturbance of August 31-September 1, 1906. The following is a memorandum on the subsequent course pursued by the disturbance:—

In continuation of the account published in the *West Indian Bulletin*, it has been found possible, through the medium of publications supplied through the courtesy of the Weather Bureau of the U. S. Department of Agriculture and the Meteorological Office, London, to trace the subsequent path of the disturbance, and from these the following account of the track followed by the storm has been abstracted:—

After passing to the north of Antigua and St. Kitt's on August 31-September 1, the cyclone was, on September 2, central east of Porto Rico and apparently moving a little west of north. On the 3rd., it was apparently central NW of San Juan and appeared to be increasing somewhat in intensity. On the 4th., it was ESE to ENE of Turks Island and was thought to be diminishing in strength. On the 5th., the disturbance was NW of Turks Island and on the 6th. was approaching the Florida coast. During the 6th. and 7th., it recurred in the vicinity of the Bahamas and was severely felt by vessels in that region. At 3 a.m. on September 7, the three-masted schooner 'John Rose' recorded a barometer reading of 29.01 inches in latitude 28°37' N., longitude 77°4' W. On the 8th., the centre was 31°N. 71°W., approximately. The S.S. 'Anglo-Australian' was within 50 miles of the heart of the storm at this time and encountered a strong gale with wind from the south—barometer 29.06 inches. The vessel was bound to the westward, and the barometer continued to fall till 4 p.m., when it was reading 28.71 inches.

By the morning of the 9th., the centre had passed west and north of Bermuda, the reading of the barometer at Hamilton being 29.18 inches, and on this date the S.S. 'Corfe Castle,' of the Union Castle line, encountered the full force of the hurricane in latitude 35° N., longitude 66° W., the lowest barometer reading recorded being 28.10 inches at 5.30 p.m. on this date. On the 10th., the storm centre appears to have been in latitude 39°N. and longitude 55°W., and here the S.S. 'Koenigin Louise' encountered the storm on this date. On the 11th., the centre was apparently in 46°N. 49°W., with the barometer below 29.3 inches; strong winds were still blowing, but the cyclone had lost much of its energy. On the 12th., the centre was in about 50°N. 29°W., and the unsettled weather experienced in the north-west of the British Islands from the 13th. to the 16th. was probably associated with this storm system.





## GLEANINGS.

The Agricultural Superintendent at Barbados announces that he has for free distribution a small quantity of seeds of the white pigeon pea.

The nursery of the Board of Agriculture and Forestry of Hawaii has adopted banana-leaf pots for small plants. 'By the use of these pots the roots are not disturbed in transplanting, as the whole pot and its contents are planted together.'

At a meeting of the Barbados House of Assembly on March 12, the following were chosen to serve on the directorate of the Sugar Industry Agricultural Bank: the Speaker (the Hon. F. J. Clarke), the Hon. G. Laurie Pile, and Messrs. H. B. Skeete and C. P. Clarke.

The 'male bamboo' of India (*Dendrocalamus strictus*), whose solid stems are much used for spear shafts, fishing rods, etc., flowers on a few branches, sometimes every year. It does not die after flowering. It is specially suited to dry places, grows about 30 feet high, and flourishes well in the West Indies.

According to an article in the *Tropenpflanzer*, for January, the production of sisal hemp in German East Africa is now over 1,000 tons per annum. It is sold at over £40 per ton. The whole of the product goes to Germany, and seems to replace there the lower qualities of Manila hemp in the manufacture of rope.

The Board of Agriculture in British Guiana has several water buffalos for sale. These animals are suitable for draft purposes on estates. Particulars as to their characters, number, and probable prices can be obtained on application to the Secretary. Reference was made to the use of water buffalos in Trinidad in the *Agricultural News*, Vol. IV, p. 55.

At a meeting of the Dominica Agricultural Society on February 23, Dr. H. A. Alford Nicholls, C.M.G., delivered a presidential address reviewing the work of the society. Among the subjects referred to by Dr. Nicholls were: the hurricane insurance scheme, the citrate of lime industry, the shipment of green limes, etc.

The Director of Forests and Gardens in Mauritius reports in the *Natal Agricultural Journal* that the production of fibre from *Furcraea gigantea* is a paying industry in Mauritius. The leaves can be cut about four years after planting, and then about every year and a half, till the plants send up their flower stems with bulbils. One acre gives about 60,000 leaves, producing a ton of dry fibre, which sells in London at £25 to £35.

Messrs. Gordon & Diolen, of Dominica, announce that they are in want of bay leaves in large quantities.

On the recommendation of the Board of Agriculture in Jamaica, Mr. Percival Murray, Superintendent of Sugar-cane Experiments, has been appointed Instructor for School Gardens.

Latest advices from England on the shipments of cotton are highly gratifying. Mr. A. Smith, of Argyle, the winner of the gold medal offered for competition by Sir Alfred Jones, has obtained the highest price as yet paid for St. Vincent cotton for one of his marks, which sold at 31d. per lb. (*St. Vincent Times*.)

In a bulletin issued by the Porto Rico Agricultural Experiment Station, it is stated that the great mistake that has been made in agricultural practice in Porto Rico is the continued cropping of soils without the addition of manures. The following natural manures are referred to as available: pen and stable manure, tobacco stalks and refuse, bat guano, wood ashes, and compost heap material.

The Governor of the Windward Islands has appointed a Commission to inquire into the conditions of the peasant proprietors in Grenada, more especially as regards the present system of obtaining advances to aid them in the cultivation of their holdings. The Commission is composed of the Hon. Frank Gurney, M.L.C., the Hon. John Martin, M.L.C., and Mr. George Whitfield Smith.

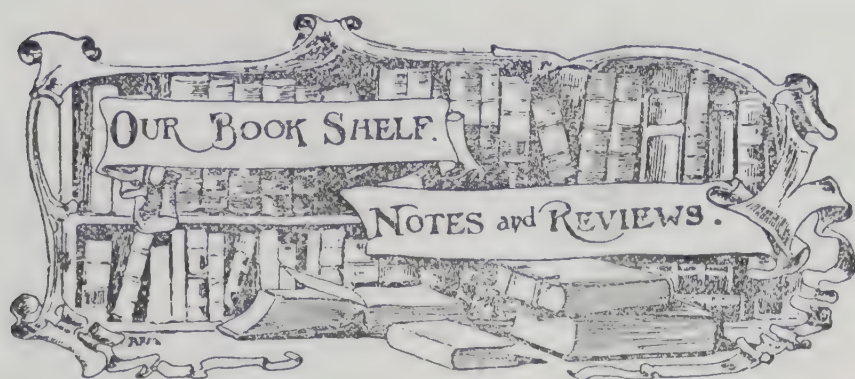
In the *Agricultural Bulletin of the Straits and Federated Malay States* for last November, the Director of the Botanic Gardens records his experiments on the application of copper sulphate to algae and other water plants which fouled the lakes of the Botanic Gardens. *Crenothrix*, *Cyanophyceae*, *Utricularia*, and *Chara* were killed by copper sulphate, but it required to be used in quantities too large to allow the water to be safely used for human consumption.

The *Natal Agricultural Journal*, for December 1906, gives an account of the bamboo fruit-box, often seen in Natal and the Transvaal. For boxes to hold up to 100 lb., two-ends are made of square board, while the sides are formed of spaced slats of bamboo, nailed from board to board. A bamboo of 4 inches in diameter will give about five slats. These boxes cost less than half as much in Natal as boxes made wholly of board.

The Editor of *Gleanings in Bee Culture*, February 15, states that the new pure food law of the United States has increased the price of honey and sugar-cane syrups, since syrups made from corn glucose can no longer be substituted for the genuine products. The U.S. Department of Agriculture has established an experimental syrup farm at Waycross, Georgia, where pure syrup is to be produced without the use of sulphur or other chemicals.

The nicker bean with lead-coloured seeds (*Caesalpinia Bonducella*) is cosmopolitan in the tropics. In the Philippines, its seeds are eaten for derangements of the stomach, and as a febrifuge or tonic. An adult will eat ten to twelve seeds. A resinous substance called bonducin, which is exceedingly bitter, can be prepared from the seeds. In India, the powdered seeds are called 'poor man's quinine,' but experiment has shown that the physiological effects of quinine are altogether absent. (*Philippine Journal of Science*, December 1906.)





**RUBBER IN THE EAST:** *Official Account of the Ceylon Rubber Exhibition.* Edited by J. C. Willis, Sc.D., F.L.S., M. Kelway Bamber, F.I.C., F.C.S., and E. B. Denham. Colombo: H. C. Cottle, Government Printer, Ceylon, 1906.

It is stated in the prefatory note that the publication of this volume represents the first step in the formation of a standard series of Manuals of Tropical Botany, Entomology, Agriculture, and Horticulture, to be known as the 'Peradeniya Manuals.'

In this, the first 'Manual,' are published the lectures delivered during the Ceylon Rubber Exhibition, opened on September 13, 1906, together with the discussions which followed them. 'All lectures have been fully revised by lecturers, and have then been arranged in logical order with the hope of making this account a standard treatise upon the rubber industry as it at present exists.'

Probably the most important chapter is the one dealing with 'The cultivation of rubber in Ceylon and other countries, treatment of diseases, etc.' This contains a detailed account of a demonstration given by Mr. Herbert Wright at Henaratgoda, where the first Para rubber trees brought to Ceylon are to be seen growing. Mr. Wright explained in detail the results of the recent experiments in tapping, and gave valuable data as to the yield of the trees at different ages. Lectures were also given by the Entomologist and the Mycologist. Mr. J. B. Carruthers dealt with 'Rubber in the Malay Peninsula,' while Mr. E. G. Windle lectured on 'Rubber in South India.' Mr. Wright's lecture on the cultivation of rubber trees contains much valuable information.

The chapter on the vulcanization of rubbers deals with the new method introduced by Mr. Bamber, which 'may, at any time, transfer the subsidiary industry of vulcanization, or rather of sulphurization, to the tropics.'

It will be seen that the publication of these lectures makes an important addition to the literature of rubber production. The 'Manual' is nicely got up, being provided with twenty-four full-page illustrations, in addition to a number of text figures and seven maps.

**POULTRY KEEPING AS AN INDUSTRY FOR FARMERS AND COTTAGERS:** By Edward Brown, F.L.S. London: Edward Arnold, 41 and 43, Maddox Street, W., 1906. Price 6s. net.

This is a companion volume to Mr. Brown's valuable book *Races of Domestic Poultry*, which was reviewed in the *Agricultural News*, Vol. V, p. 397. The first edition was published in 1891; it is now in its sixth edition. It runs to 206 pages and contains upwards of 100 illustrations.

The principal aim of this book is to show how poultry keeping can be profitably carried on as an adjunct to ordinary farming, and satisfaction is expressed in the preface that so much more attention is now paid to poultry by farmers, 'many of whom recognize, as they have never done before, that an industry which can, by proper attention and skill, be capable of securing quickly gained cash, without interfering

with other sections of the farm economy, and yield adequate profits, is worthy their time and thought.'

Since it first appeared, many chapters of this book have been rewritten to bring them into relationship with present-day experience. Every phase of poultry keeping is thoroughly discussed. The poultry keeper is shown how to carry on scientific systems of selection of birds for table purposes, laying purposes, or both. Instruction is given as to the best methods of housing, feeding, etc. A chapter is devoted to artificial hatching and rearing, while the anatomy of the fowl and the formation of the egg and chicken are explained in simple language.

Those who have seriously taken up this industry in the West Indies will be certain to find Mr. Brown's work of great assistance to them; to all such it is cordially recommended.

### NEW DISEASE OF CACAO.

In October of last year, diseased specimens of roots and stems of cacao were forwarded to this department by Mr. J. H. Hart, F.L.S., Superintendent of the Royal Botanic Gardens, Trinidad, from a southern district of that colony, with the report that many trees were being killed.

These were examined by the Mycologist, who reported that large numbers of septate, dark-coloured mycelial threads were present in the vessels of the roots and that other hyphae were in sufficient quantity in the vessels, medullary rays, and other cells of the stems to upset the nutrition of the plants and probably to produce their death.

The mycelium in the stem appeared to be continuous with the black fruiting-bodies that burst through the bark, and the fungus was provisionally identified (if the two-celled brown spores were to be considered the final end of the development) as a species of *Lasiodiplodia*.

Specimens were forwarded to the U. S. Department of Agriculture, Washington, for confirmation of identification, with an inquiry as to the similarity between the Trinidad species and a disease they have in hand from Brazil and San Domingo. In reply to this inquiry, it is stated that 'the fungus in the stem is the same referred to (*Lasiodiplodia* sp.) in the article in the *Journal of Mycology*, for July 1906, as attacking *Theobroma Cacao* and *Mangifera indica*,' but that 'the decision as to the identity of the fungus in the roots must be reserved until development of cultures may render its recognition possible.'

The presence of this fungus on cacao in countries as far distant as Brazil and San Domingo is of importance to planters in the West Indies, who should be on the lookout for trees that possess an unhealthy appearance. These should be carefully watched, and examination should be made for signs of fructifications on the bark of the stems.

All diseased twigs and branches should be cut out and burned and all dead trees should be completely uprooted and destroyed, while the land should be treated with lime before the planting of supplies or young cacao. The collection and burial of diseased pods should also be undertaken in order to remove sources of infection.

Nothing can be said as to the extent of the damage that this fungus can produce until further information has been obtained, but every effort should be made to keep up the health of the cacao trees, as it is more than probable that healthy, vigorous trees will not be readily attacked. The finding of this fungus on the mango, as well as upon cacao, renders it necessary to watch all mango trees in the affected area for any appearance of disease, for the prompt destruction of all diseased material should tend to keep the disease well in hand.



## CANADIAN TRADE DELEGATION.

The following are the public telegrams recording the movements of the Canadian Trade Delegation:—

### British Guiana, March 5.—

The Canadian Delegation, accompanied by Sir Daniel Morris, arrived on Sunday morning by the S. S. 'Olenda,' and was cordially received by representatives of the Chamber of Commerce and the Agricultural Society. The delegates attended a large and representative meeting yesterday at noon, at which his Excellency the Governor was present. Afterwards, they were entertained at lunch at the Georgetown Club, and left in the 'Olenda' for Trinidad at 5.30 p.m. The visit was in every way most interesting and successful.

### Trinidad, March 7.—

The Canadian Delegation was warmly received on its arrival here yesterday. A public meeting, attended by leading representatives of the mercantile and agricultural communities, was held at the Red House at 2 p.m., with the President of the Chamber of Commerce in the chair. The question of preference to British-grown sugar in the Canadian markets was discussed, and the present position fully explained. Valuable suggestions were also presented as to the best means of improving trade relations between Canada and Trinidad. A dinner followed in the evening at Queen's Park Hotel. The Governor and Sir Daniel Morris were present, and interesting speeches delivered. The delegates and their friends are to-day visiting the country districts, and will leave in the S. S. 'Olenda' for Grenada at 6 p.m. It is expected Barbados will be reached early on Saturday morning.

### Grenada, March 8.—

The Canadian Delegation, accompanied by Sir Daniel Morris, the Imperial Commissioner of Agriculture, arrived here by S. S. 'Olenda' at 7 a.m. from Trinidad. After breakfast at Government House, a conference followed, at which were present the principal Government officers and the leading representatives of the commercial and agricultural interests; the Governor presided. Interesting speeches were made, the leading features of which were the best means for improving trade relations between Grenada and the Dominion. The delegates expressed their surprise at finding Grenada such a progressive colony, and promised to embody their impressions of the island in their report, and to use their influence in the direction of re-establishing direct steam communication with Canada. Sir Daniel Morris, on behalf of the delegates, thanked his Excellency for his hearty and cordial reception. The conference broke up at 11.30 a.m., and the delegates left at noon for Barbados.

### Barbados, March 11.—

The Canadian Delegation returned here on the S. S. 'Olenda' on Saturday morning. Soon after their arrival the delegates attended a meeting of merchants, agriculturists, and Government officials at the Commercial Hall, and considered the questions which had been prepared for discussion. The meeting was presided over by the Chairman of the Committee of Commerce, Mr. V. Hänschell; transportation formed an important subject, and this will engage the attention of the delegates on their return home. The delegates recommended for the consideration of West Indian Chambers of Commerce and their legislatures and administrations the matter of intercolonial reciprocal arrangements, whereby Canadian foodstuffs and manufactures should be benefited on an equal footing with other British products. Such a step on the part of the West Indies

would undoubtedly, in their opinion, tend to draw closer the commercial relations with the Dominion, and would be in accord with the recent speech of the Under-Secretary of State for the Colonies (Mr. Winston Churchill), as reported in *The Times*, for February 8, in which he indicated that the Government would welcome intercolonial reciprocal arrangements. In the evening, a dinner was given in honour of the delegates at the Marine Hotel, comprising a representative gathering of commercial and agricultural gentlemen and invited guests from abroad. Interesting speeches were made by all of the delegates, the Chairman of the Committee of Commerce (Mr. V. Hänschell), who presided, and by Sir Daniel Morris. On Sunday, the delegates and their ladies joined a large party of ladies and gentlemen invited by the Committee of Commerce in an excursion to Bathsheba; they returned to town at 6 p.m. The excursion proved a great success. The delegates were received by his Excellency Sir Gilbert Carter to-day, and will attend a garden-party given in their honour by Lady Morris at Chelston this afternoon before sailing. Sir Daniel Morris is, unfortunately, prevented from accompanying the delegates to the Northern Islands by many urgent matters connected with his department requiring his personal attention. The 'Olenda' with delegates leaves to-night for St. Lucia.

### St. Lucia, March 13.—

Steamer 'Olenda,' scheduled to arrive here on Monday, came in only yesterday at 3.30 p.m., upsetting all arrangements made for entertainment of Canadian delegates. They were received at the Royal Engineers' Building, Castries, in the presence of a representative assembly of merchants and planters and a large number of the inhabitants, by his Honour the Administrator, who welcomed them in an appropriate speech, to which Mr. Allan, of Toronto, replied. The Hon. E. G. Bennett addressed the delegates from the agricultural, and the Hon. G. Graf from the commercial standpoint. All the delegates spoke to the points raised by the speakers. They then visited in detail, accompanied by merchants and planters, the excellent exhibition of products of the island exportable in commercial quantities, displayed in the hall, and expressed surprise and gratification at the evidences of the natural resources of St. Lucia, as well as satisfaction at the disposition exhibited to broaden trade relations with the Dominion when existing difficulties are smoothed out.

### Dominica, March 13.—

The Canadian delegates arrived here this morning and attended at 10 a.m. a public meeting in the Court House, presided over by the Administrator. The leading merchants, the President of the Agricultural Society, and several of the principal planters took an active part in the proceedings, which were of an extremely interesting nature, many matters concerning trade between the Dominion and the island, transportation, and preferential colonial reciprocal arrangements being discussed at length. At the close of the proceedings, Mr. Allan, the delegate from Toronto, delivered an eloquent speech which roused the meeting to enthusiasm. The visit of the delegates is likely to have a markedly beneficial effect on trade between Canada and Dominica.

### Antigua, March 14.—

The Canadian delegates arrived here in S. S. 'Olenda' at 10.30 a.m. and were met by the Reception Committee. An influential meeting of agricultural and business men was held in the Council Chamber at Government House, at



## CANADIAN TRADE DELEGATION.

(Concluded.)

11 a.m., under the presidency of his Excellency Sir E. B. Sweet-Escott, K.C.M.G., who, in his opening speech, welcomed the delegates to Antigua. Subsequently the Governor withdrew, and the meeting, with the Hon. J. F. Foote in the chair, discussed points of commercial importance, including the expansion of trade between the West Indies and Canada, and the question of the Canadian market for West Indian sugars. After the meeting the delegates were entertained at a public lunch, at which his Excellency the Governor presided. This was followed by a drive in the country, halting for tea at Millars, the residence of the Hon. J. J. Camacho. This evening the delegates will be entertained at dinner at Government House by his Excellency the Governor and Lady Sweet-Escott. The Hon. Dr. Watts, C.M.G., accompanies the delegates to St. Kitt's.

### St. Kitt's, March 16.—

The Canadian delegates arrived yesterday by S. S. 'Olenda' and were received by the reception committee of the Agricultural and Commercial Society. They were entertained at luncheon by the Society, his Honour the Administrator being present. At 3 p.m. a large and influential meeting was held at the Court House, under the chairmanship of the Administrator, at which questions relating to trade and commerce were fully discussed between members of the delegation and the leading merchants and planters, the various items of imports in which Canada is specially interested being dealt with separately. The meeting was most interesting and enthusiastic, eloquent and impressive addresses being delivered by the several delegates, as well as by Hon. J. T. Manchester, Hon. Dr. Watts, and others. The delegates and the Executive Committee of the Society were entertained at dinner in the evening by his Honour the Administrator. They leave to-day for Canada about 2 p.m.

The Delegation consisted of Messrs. J. D. Allan (Toronto), H. B. Schofield (St. John, N.B.), A. E. Jones (Halifax), and T. M. Fraser (Secretary).

## IMPROVEMENT OF WEST INDIAN FRUITS.

In the temperate regions of Western Europe, Eastern Asia, North America, South Africa, and Australia a number of fruit trees and shrubs are regularly grown in orchards and gardens. Their fruit is the source of quite a considerable industry in orchard growing, fruit drying, and preserve making.

In most cases the wild fruits of which these cultivated forms are improvements are known, but would be regarded to-day as nearly or quite worthless. No cultivated fruit trees or shrubs of any value in the temperate regions are regularly propagated by seed, but by detached pieces of stems, i.e., by grafts, buds, suckers, cuttings, or layers. Thus, all the valuable varieties of the following temperate and subtropical fruits are propagated asexually: grape, apple, plum and prune, peach, cherry, pear, strawberry, apricot, currant, raspberry, gooseberry, quince, fig, orange and other citrus fruits, date, pomegranate, persimmon, and others.

Of each of these temperate and subtropical fruits there are cultivated varieties, sometimes numbering many hundreds, many of which are useful for different regions or purposes. New varieties, e.g., of grapes, are being continually produced. To produce new kinds it is necessary nearly always to sow large quantities of seed, and select the best one or two of the

resulting plants. Very often a previous hybridizing aids greatly in the rapid attainment of the result. When one superior tree has been thus obtained, it is thereafter propagated asexually, since its seed will produce plants which are usually nearly all inferior. This production of improved varieties of temperate, and, to some extent, of subtropical fruits is continually going on. Each improved individual is a prize to the breeder, since he is able to sell his stock of plants, asexually propagated from this superior tree, at high prices.

The effects of propagating fruit trees by seed alone is to cause variation in the offspring; so that when seed is taken from a superior tree, few of the resulting plants will be as good as their parent. Hence, it will be only after many generations of continuous selection that the superior characters will be more or less fixed. The long time and great expense required to grow large numbers of trees, most of them useless, render this method applicable only to short-lived herbaceous plants, such as tomatoes and melons. Even then the strain must be kept up to the mark by continued selection, or the best varieties gradually deteriorate.

From the foregoing it is obvious that there is a vast advantage in propagating any superior individual variety of fruit, once it has been found, by budding or the like. The universal prevalence of this practice in the great centres of civilization is thus explained. The orange and mango have been cultivated in Asia in civilized communities for ages, and the practice of propagating good kinds by budding and grafting is of ancient origin. The European and Asiatic oranges are universally budded, and the garden mangos of India are as universally grafted. The banana, bread-fruit, and pine-apple, on account of their easy propagation by suckers, have long been multiplied in this manner and have nearly or wholly lost their seeds. As a consequence, new varieties of the two former cannot easily be produced, and new pine-apples are only to be got by pollinating, sowing the seed, and selecting the one or two good from the hundreds or thousands of inferior.

Because of the large numbers of fruit trees in the West Indies which have grown from seed, this region is really one large experiment station for the production of new varieties. The last part of the experiment alone remains to be completed. This is the examination of all the seedling trees and the discovery of the few superior individuals of each kind, which are then propagated asexually by buds, grafts, cuttings, etc. In this way only can the many tropical fruits which grow here be permanently improved. This is already being done with mangos and other fruits in Trinidad and Jamaica. The navel seedless orange, which was propagated by budding from a single tree found in Brazil, and which is the foundation of the orange industry of California, is an example of the prizes which await seekers in this field of enterprise. But the sweet sop, sapodilla, avocado, guava, Barbados cherry, custard apple, mamme apple, mamme sapota, genip, sour sop, star-apple, golden apple, akee, Otaheite gooseberry, cashew nut, pomme rose, Java plum, and others present a wide field for improvement by this method. A beginning has already been made with some of these, e.g., guava, avocado, and sapodilla. There is a better foundation to work on in the West Indies than in the temperate regions, since, for example, the wild pear, apple, and plum are very small and nearly inedible. It is hoped that in the future the orchards and gardens of the West Indies may yield fruits as much superior in size and flavour to the practically wild produce of many of the present kinds, as the best pears of Europe to-day are superior to the small, practically inedible pear of the beginning of the Christian era.



## MARKET REPORTS.

**London**,—February 26, 1907. 'THE WEST INDIA COMMITTEE CIRCULAR,' Messrs. KEARTON, PIPER & Co.; Messrs. E. A. DE PASS & Co., February 22, 1907; 'THE LIVERPOOL COTTON ASSOCIATION WEEKLY CIRCULAR,' February 22, 1907.

ARROWROOT—St. Vincent,  $2\frac{1}{4}d.$  per lb.  
BALATA—Sheet,  $1/6$  to  $2/7$ ; block,  $1/10$  to  $1/10\frac{1}{2}$  per lb.  
BEES'-WAX—£8 per cwt.  
CACAO—Trinidad, 85/- to 92/- per cwt.; Grenada, 73/- to 78/- per cwt.  
COFFEE—Jamaica, good to fine ordinary, 43/- to 47/-; greenish to fine, 51/- to 120/- per cwt.  
COPRA—East Indian, £27 5s. to £28 5s. per ton.  
COTTON—Good medium fine, 6·95d.; West Indian Sea Island, good medium, 19½d.; medium fine, 20½d.; fine, 22d.; prices paid, 7½d. to 25d.  
FRUIT—  
GRAPE FRUIT—12/- to 14/- per box.  
BANANAS—Jamaica, 4/- to 6/- per bunch.  
ORANGES—no quotations.  
PINE-APPLES—St. Michael's, 1/9 to 4/- each.  
FUSTIC—£4 5s. to £4 15s. per ton.  
GINGER—Jamaica, common, 58/- to 60/-; medium to fine, 62/- to 85/- per cwt.  
HONEY—20/- to 25/- per cwt.  
ISINGLASS—West Indian lump, 1/7 to 2/3; cake, 11d. per lb.  
LIME JUICE—Raw, 1/- to 1/5 per gallon; concentrated, £23 per cask of 108 gallons; Distilled Oil, 2/10 to 2/11 per lb.; hand pressed, 3/3 to 3/6 per lb.  
LOGWOOD—£4 5s. to £4 15s.; roots, £3 5s. to £4 5s. per ton.  
MACE—Pale, 1/6 to 1/7; red, 1/4 to 1/5; broken, 1/1 per lb.  
NUTMEGS—62's, 1s. 5d. to 1s. 7d.; 66's, 1s. 3d.; 70's, 10½d.; 80's, 10d.; 93's, 8d.; 106's, 6½d.; 112's, 6d.; small 4½d. to 5½d.  
PIMENTO—Fair, 2½d. to 2¾d. per lb.  
RUM—Jamaica, 2/9; Demerara, 1/2 to 1/3½ per proof gallon.  
SUGAR—Crystals, low to good yellow, 15/3 to 16/6; fine, 17/- to 17/3; Muscovado, 14/- to 14/6; Molasses, 11/6 to 12/- per cwt.

**Montreal**,—January 18, 1907.—Mr. J. RUSSELL MURRAY.  
(In bond quotations, c. & f.)

COCOA-NUTS—Jamaica, \$27·00; Trinidad, \$25·00 per M.  
COFFEE—Jamaica, medium, 10c. to 12c. per lb.  
GINGER—Jamaica, unbleached, 13c. to 14c. per lb.  
MOLASSES—Barbados, 27c. to 28c.; Antigua, 25c. to 26c. per Imperial gallon.  
NUTMEGS—Grenada, 110's, 15c. to 16c. per lb.  
PIMENTO—Jamaica, 5¼c. to 5½c. per lb.  
SUGAR—Grey crystals, 96°, \$1·98 to \$2·05 per 100 lb.  
—Muscovados, 89°, \$1·40 to \$1·50 per 100 lb.  
—Barbados grocery, \$2·10 to \$2·25 per 100 lb.

**New York**,—February 21, 1907.—Messrs. GILLESPIE BROS. & Co.

CACAO—Carracas, 18½c. to 19c.; Grenada, 17c. to 17½c.; Trinidad, 18c. to 18½c.; Jamaica, 15c. to 16½c.; Dominica, 16c. to 16½c. per lb.  
COCOA-NUTS—Jamaica, \$23·00 to \$25·00; Trinidad, \$21·00 to \$22·00 per M.  
COFFEE—Jamaica ordinary, 7¼c. to 8c.; good ordinary, 8½c. per lb.  
GINGER—Dark scraggy root, 10¼c. to 11c.; small to bright bold, 11½c. to 13c. per lb.  
GOAT SKINS—Jamaica, Antigua, and Barbados, 62c.; St. Kitt's, St. Thomas, and St. Croix, dry flint, 55c. to 57c. per lb.  
GRAPE FRUIT—Jamaica, \$4·00 to \$5·00 per barrel; \$2·00 to \$2·50 per box.

LIMES—Dominica, \$5·00 to \$6·00 per barrel.  
MACE—33c. to 35c. per lb.  
NUTMEGS—95's to 100's, 16c.; 100's to 110's, 11½c. to 12c.; 130's, 11c.  
ORANGES—Jamaica, \$3·50 to \$4·00 per barrel; \$1·75 to \$2·00 per box.  
PIMENTO—5¼c. to 5½c. per lb.  
SUGAR—Centrifugals, 96°, 3·38c. to 3·42c.; Muscovados, 89°, 2·88c. to 2·92c.; Molasses, 89°, 2·63c. to 2·67c. per lb., duty paid.

## INTER-COLONIAL MARKETS.

**Barbados**,—March 11, 1907.—Messrs. T. S. GARRAWAY & Co., and Messrs. JAMES A. LYNCH & Co.

ARROWROOT—St. Vincent, \$4·50 to \$4·25 per 100 lb.  
CACAO—Dominica, \$12·00 to \$15·00 per 100 lb.  
COCOA-NUTS—\$14·00 per M. for husked nuts.  
COFFEE—\$10·25 to \$10·50 per 100 lb.  
HAY—\$1·25 per 100 lb.  
MANURES—Nitrate of soda, \$65·00; Ohlendorff's dissolved guano, \$55·00; Cotton manure, \$42·00; Cacao manure, \$42·00 to \$45·00; Sulphate of ammonia, \$75·00; Sulphate of potash, \$67·00 per ton.  
MOLASSES—18c. per gallon.  
ONIONS—\$2·90 to \$3·00 per 100 lb.  
POTATOS, ENGLISH—Nova Scotia, \$2·20 to \$2·30 per 160 lb.  
RICE—Demerara, \$5·65; Ballam, \$5·45 per bag (190 lb.); Patna, \$3·00; Rangoon, \$2·70 per 100 lb.  
SUGAR—Muscovado, \$1·55 per 100 lb.  
SYRUP—16½c. per gallon.

**British Guiana**,—March 16, 1907.—Messrs. WIETING & RICHTER.

ARROWROOT—St. Vincent, \$11·50 per barrel.  
BALATA—Venezuela block, 25c.; Demerara sheet, 38c. per lb.  
CACAO—Native, 17c. to 18c. per lb.  
CASSAVA—60c. to \$1·00 per barrel.  
CASSAVA STARCH—\$6·00 per barrel.  
COCOA-NUTS—\$10·00 to \$12·00 per M.  
COFFEE—Creole, 14c. to 15c.; Jamaica, 14c. to 14½c. per lb.  
DHAI—\$4·30 to \$4·35 per bag of 168 lb.  
EDDOS—\$1·00 to \$1·44 per barrel.  
MOLASSES—16c. per gallon.  
ONIONS—Lisbon, 4c. to 4½c. per lb.  
PLANTAINS—16c. to 40c. per bunch.  
POTATOS, ENGLISH—Nova Scotia, \$2·90 to \$3·00 per barrel.  
POTATOS, SWEET—Barbados, \$1·20 to \$1·32 per bag.  
RICE—Ballam, \$5·90 to \$6·00 per 177 lb.; Creole, \$4·75 to \$4·80 per bag (ex store).  
SPLIT PEAS—\$5·80 to \$5·90 per bag (210 lb.).  
TANNIAS—\$2·40 per bag.  
YAMS—Buck, \$2·64 per bag.  
SUGAR—Dark crystals, \$2·00 to \$2·10; Yellow, \$2·60 to \$2·70; White, \$3·50 to \$3·60; Molasses, \$1·40 to \$1·75 per 100 lb. (retail).  
TIMBER—Greenheart, 32c. to 55c. per cubic foot.  
WALLABA SHINGLES—\$3·00, \$3·75, and \$5·25 per M.

**Trinidad**,—March 15, 1907.—Messrs. GORDON, GRANT & Co.

CACAO—Ordinary to good red, \$18·25 to \$18·35; estates, \$18·65 to \$19·00 per fanega (110 lb.); Venezuelan, \$18·75 to \$19·25.  
COCOA-NUTS—\$21·00 per M., f.o.b.  
COCOA-NUT OIL—\$1·25 per Imperial gallon (cask included).  
COFFEE—Venezuelan, 7¼c. to 8c. per lb.  
COPRA—\$4·75 per 100 lb.  
DHAI—\$4·60 to \$4·75 per 2-bushel bag.  
ONIONS—\$2·50 to \$3·00 per 100 lb. (retail).  
POTATOS, ENGLISH—\$1·30 to \$1·60 per 100 lb.  
RICE—Yellow, \$5·40 to \$5·60; White, \$5·75 to \$6·00 per bag.  
SPLIT PEAS—\$5·40 to \$5·60 per bag.  
SUGAR—Yellow crystals, \$2·25 to \$2·50; molasses, \$2·00 to \$2·25 per 100 lb.





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## The Future of the Cotton Industry.

**T**HE Sea Island cotton industry in the West Indies has made such rapid strides within the last few years that a good deal of interest is being taken in it.

The visit of the President, the Chairman, and some of the prominent members of the British Cotton-

growing Association, as also of leading cotton spinners of Lancashire, in January last, was an event of such importance that it has already proved of service in drawing attention to the position and prospects of the industry. More recently these islands have been visited by the representative of a large enterprise interested in Florida Sea Island cotton. This cotton comes next in quality to the finest grades grown in the Sea Islands of America and approximates very closely to what is becoming widely known as West Indian Sea Island cotton. Within the last few days we have had in our midst Mr. A. H. Dixon, the Managing Director of the Fine Spinners' and Doublers' Association, of Manchester. The Association is one of the largest users of Sea Island cotton. It has hitherto taken, and probably will continue to take, the major portion of the cotton produced in these colonies. Mr. Dixon, during his stay at Barbados and Antigua, has very closely studied the conditions of the industry, and his wide knowledge of the conditions also existing in South Carolina, Florida, and Georgia enables him to speak with authority, from the consumer's point of view, as to what is likely to be the future of West Indian Sea Island cotton in the Lancashire and other markets.

At the invitation of the Imperial Commissioner of Agriculture, Mr. Dixon has been good enough to place on record his views as to the course that it would be wise to adopt in the further development of cotton growing in these colonies. It has been abundantly proved that the West Indies can profitably produce the finest qualities of Sea Island cotton; further, that this cotton is in good demand and obtains the highest prices,



surpassing even those obtained for the same grades in the Sea Islands. This is due to the fact that in 1903, when the industry was started on commercial lines, the Imperial Department of Agriculture was fortunate enough to secure a sufficient quantity of the best cotton seed from the Sea Islands to plant at once 7,000 acres. The seed was carefully selected and disinfected beforehand and supplied to growers at cost price. The valuable support of the British Cotton-growing Association was also an important factor at that time. It is estimated that there are now nearly 15,000 acres under cultivation in Sea Island cotton, while the value of the exports to date amount to more than a quarter of a million sterling. The prices ruling this season (1907) are exceptionally high (23*d.* to 31*d.* per lb.). This is owing to the partial failure of the crops in the United States. It is understood that such prices cannot last. The planters are, therefore, advised to look to lower prices next year, with probably 18*d.* per lb. as the average for the next three years.

In the letter from Mr. Dixon, reproduced on pp. 102-3, attention is drawn once more to the fact that for the highest qualities of Sea Island cotton there is only a limited demand, and the planters are advised that it would be to their interest to realize this, and to devote attention to the production, as a main crop, of a good, strong Sea Island cotton, of uniform length (not exceeding 1 $\frac{3}{4}$  inches or 1 $\frac{7}{8}$  inches), similar to what is grown on the mainland in South Carolina and in some parts of Florida. For this grade (selling now at about 18*d.* to 22*d.* per lb.) there is such a demand as would admit of a large extension of the area under cultivation, without risk of the supply, on an average of years, exceeding that demand.

The advice given by Mr. Dixon is timely and prompted by motives which will be appreciated by all concerned. The object he has in view has the full sympathy of the Imperial Department of Agriculture, and steps will at once be taken to consider carefully how it can be attained with due regard to the conditions now existing.

Some localities specially adapted to produce the finest qualities of Sea Island cotton might continue to do so. On the other hand, localities not so favourably situated would not act wisely in attempting to produce a poor quality of staple from the best seed, but should make a selection of seed of the standard grade recommended by Mr. Dixon. By such means, if the plants, as is probable, are hardier and more prolific, the results would be equally favourable as in localities where the finest qualities are grown.

It is hoped to return to this subject later on. In the meantime it is urged that the information kindly contributed by Mr. Dixon may receive the careful attention it deserves, and that those interested in cotton growing in these colonies will be prepared to join heartily with the Imperial Department of Agriculture in steps that would safeguard an industry which offers the means of placing several of the West India Islands in a position of comparative prosperity.



## SUGAR INDUSTRY.

### West Indian Sugars and Canadian Preference.

Mr. J. Russell Murray writes as follows, under date of March 11, in reference to his letter published in the *Agricultural News*, Vol. VI, p. 79:—

I advised you by mail on the 14th. ultimo, that the Hon. Mr. Fielding had brought into Parliament an amendment to the tariff, limiting ports for the landing of British West Indian sugars to participate in the preferential tariff to Canadian ports only.

I have now to advise you that, on the 7th. instant, this proposal was withdrawn, and in the meantime sugars, etc., arrived via United States on a through bill of lading will also be entered under the British preferential tariff according to the letter addressed to me by the Minister of Customs on January 30 (see *Agricultural News*, Vol. VI, p. 63).

### Stripping Sugar-canes.

Experiments were made in Hawaii in 1904 and 1905 on the effects of stripping trash from sugar-canes. There were three strippings. The following were the principal results:—

- (1) The average weight per acre of unstripped canes was 24.31 tons more than that of stripped canes, and the yield of sugar was 4.38 tons per acre greater.
- (2) The unstripped canes showed a gain in weight from the application of a fertilizer, and the stripped canes a loss.
- (3) There were, on the average, 2,539 more dead canes to the acre among the stripped canes than among the unstripped ones.

It appears that the stripped canes were more liable to disease, and the results in (1) and (2) are perhaps the consequence of this.

### Chemical Control in Sugar Factories.

The *National Magazine*, of Cuba, discusses the value of the chemist in the central sugar factories, pointing out how he is likely to prevent, by scientific control, needless loss. The duties of the sugar chemist are summed up as follows:—

- (1) He should keep data of the mill work, including time in operation and lost time; total tons of cane ground,



and average quantity per day, also per hour of actual grinding; the percentages of saturation and juice extraction.

(2) The statement of the quantity of sugar made and in process; the percentage yields of sugar and sucrose retained.

(3) Analysis of the juices.

(4) Analysis of the molasses, first and second test, if this distinction is made.

(5) Analysis of final molasses, true and apparent.

(6) Polarization of sugars.

(7) Analysis of press cake and bagasse.

(8) Qualitative tests of circulating and waste waters.

(9) Manufacturing data of yield and losses.

## Fungus Diseases of the Sugar-cane in Hawaii.

In Bulletin No. 5 of the Division of Pathology and Physiology of the Experiment Station of the Hawaiian Sugar Planters' Association, the Director, Dr. N. A. Cobb, brings forward some interesting information on the fungus diseases of sugar-cane in Hawaii.

He makes mention of new diseases found in the cane fields of Hawaii and of fresh aspects of diseases already known, and indicates what lines are being taken to estimate the damage caused by each and to determine the manner in which it is best to combat their attacks.

The continual cropping of the land with sugar-cane, without any rotation of crops, is in opposition to one of the fundamental precepts of agriculture and tends to accumulate diseases, and therefore the writer urges that experiments directed toward the introduction of new crops should be encouraged, as the accumulation of any disease is one of the great obstacles to the profitable repetition of a single crop on the same land.

Inspections of several cane fields in important sugar-growing districts would indicate that seldom less than 8 to 10 per cent. of the canes are attacked by root disease. This is held to be the most serious of the diseases of the sugar-cane in Hawaii, and the losses produced are so great as to constitute a serious tax on the cane industry. The external symptoms of this disease would appear to be similar to those of the root disease of the sugar-cane in the West Indies, but the principal fungus that is associated with the trouble is different. This disease is held to be caused by a species of *Ithyphallus*, a fungus that leads practically the whole of its life in the ground, the spore-bearing fructifications (which were found for the first time during the season 1906) lasting in the outer air for such a short time as frequently to escape common observation.

The most serious loss from this fungus is due to the smothering of the new shoots of ratoon stools, by means of white masses of mycelium, but the injury done to the root system of the plants is considerable. It spreads from place to place by means of the underground mycelium, while flies and other insects play an important part in the distribution of the spores.

In discussing the remedial measures that are likely to prove beneficial in combating this disease, Dr. Cobb strongly recommends the application of 'lime as nearly unslaked as possible and in the maximum quantity the land will stand up to at least 1½ tons per acre;' and it should be applied along the old cane stumps in such a way that each stool of stumps gets its proportional share. The application should be made as soon after the burning over of the field as possible and should be allowed to remain a few days to sink in before ploughing operations are commenced. Other remedial measures are:

(1) destruction of fructifications of *Ithyphallus*; (2) keeping away trash from the cane cuttings during planting; (3) abandoning of ratooning in any badly affected fields; (4) breaking open of the stools of ratoon cane stumps; and (5) destruction of flies. It is also pointed out that everything should be done to make the conditions as favourable as possible for the canes by means of careful cultivation.

A leaf-splitting disease is destructive to young cane, particularly during the cool season. It is recognized by the appearance of whitish stripes between the fibres or vascular bundles of the leaves. This striping is first noticeable near the tips of the outer leaves, and, later, the inner leaves become affected and the stripes increase in area and progress downward on all the leaves. When it has proceeded so far as to destroy most of the green colour of the leaves, the lighter portions begin to shrivel and assume a dry, whitish appearance, and in these dry stripes, black subspherical spots, the fructifications of a fungus, provisionally named *Mycosphaerella striatiformis*, can be observed. Later the leaves split into shreds and present a very characteristic appearance.

It is not yet known whether any particular variety is more resistant to the disease than another, and as it is probable that plants are attacked as they issue from the soil through the spores that have fallen to the ground by the crumbling of the leaf-tissues, all efforts to check the blight must be directed towards the destruction of dead tissues containing fungus spores.

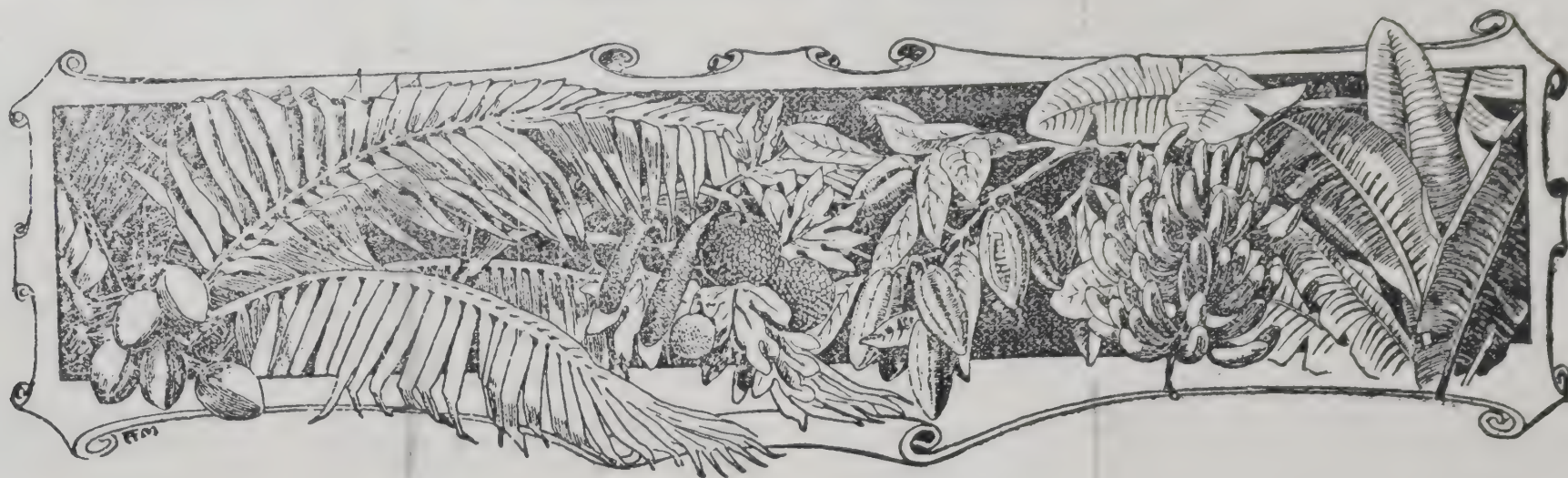
The 'rind disease' of the sugar-cane and the 'pine-apple disease' of cane cuttings are also noticed, and remedial measures suggested, while the disease of Hawaiian cane known as 'Eleau' appears to be wide-spread. The last rarely affects more than a few stalks in a single stool, and these generally attract attention when one-quarter to one-third grown. They are discoloured and shrunken in appearance and usually fall away somewhat from the rest of the stool, the leaves being affected similarly. The sheaths of the lower leaves assume a characteristic purplish colour and are bound together, apparently by the growth of a fungus. Under these leaf-sheaths are often found lepidopterous larvae.

## USES OF LIME IN THE SOIL.

The following is abstracted from the Cantor Lectures delivered by Mr. A. D. Hall, M.A., Director of the Rothamsted Experimental Station, before the Society of Arts:—

Few of the artificial fertilizers can yield their full value unless there is a sufficiency of lime in the soil to act as a base. Only basic slag and nitrate of soda are independent of a supply of carbonate of lime in the soil. The presence of some free base is necessary to the nitrification of the ammonia compound which is formed with the clay in the soil. If the ammonia remains unchanged, from the absence of lime, it is seized upon by fungi and wholly or partly lost to the plant. The decay of organic nitrogen compounds into forms such as ammonia is chiefly brought about by bacteria, which require for free growth neutral or very faintly alkaline soil. Hence sour soils are sterile and can be made fertile by application of lime. Carbonate of lime is necessary to prevent or diminish the formation of phosphates of iron and aluminium, which are but slightly available for the plant. This is especially so when superphosphate is applied to the soil. Carbonate of lime in the soil not only liberates potash from insoluble silicates but tends to prevent soluble potash salts applied as manure from passing into an unavailable condition.





## WEST INDIAN FRUIT.

### CULTIVATION OF ORANGES IN INDIA.

The *Agricultural Journal of India*, for January, contains an article on 'Orange Cultivation in the Central Provinces.'

No plants are grown from seed, the practice of budding having been long universal. The stocks used are the 'sweet lime' or the 'common citron.' The stock used has a decided influence on the fruit, since trees on the sweet lime stock have sweeter fruits with thin adherent skins, while those on the citron stock have loose-jacketed fruits, come into bearing more quickly, and have a somewhat longer life.

Seedlings of sweet lime and citron are grown in special beds, manured, irrigated, and carefully tended until, at two years old, they are budded. They are then about 2 feet high. They are budded between November and January, at times when the bark of both the seedling stock and the orange tree from which the bud is taken become loose from cambial activity. When the bud commences to grow freely, the main shoot of the stock is severed. Pits, 3 feet square and 4 feet deep, are dug 12 feet to 15 feet apart. At the beginning of the rainy season in June, these pits are filled up with equal parts of earth and old pen manure. The budded orange plants are set out in these spots in August, at the middle of the rainy season. If the expected rains do not arrive, the young trees are irrigated twice a week during the first month. Throughout the cold season they are irrigated every nine to twelve days. In the following hot season, the plants are watered every four to six days. Mature trees are irrigated less often. The soil is hoed frequently and ploughed before and after the rains, old pen manure being applied round each tree.

These orange trees bear fruit in their third year from planting out, i.e., in the fourth year from budding. After about fifteen years of bearing the yield lessens. Then new budded plants are set out in the intervening spaces, and when these begin to bear the old trees are cut out. Each tree, in full bearing, will give about 1,000 oranges a year.

The orange tree in the Central Provinces blossoms normally from June to July, the fruits from these flowers ripening from February onwards. There is another blossoming from February to March, producing ripe oranges from December to January. The same tree is not, usually, allowed to bear both crops, as this weakens the tree and shortens its life. The crop is therefore regulated by judicious root-pruning. A fortnight before the June rains, around each selected tree, a trench is dug about 1 foot deep and 2 feet broad, and reaching within 1 foot of the trunk. On thus exposing the roots, care is taken not to injure the large ones,

but only to prune off the small fibrous roots. When the loss of water thus produced begins to cause some leaves to drop off, the trenches are filled with old manure, mortar, or ashes, mixed with one-third of good earth. Then the trees are irrigated every four days until the rains come. In a fortnight the trees will have put out new leaves and blossoms, which bear ripe fruit about February. A similar treatment of the rest of the trees in January produces the other crop.

The practice of pruning the branches is unknown to the Nagpur gardener, but there is no doubt that benefit would result from cutting out weak and withered branches.

### FIBRE-YIELDING AGAVES.

Dr. K. Braun, in *Der Pflanze* (German East Africa, 1906), gives an account of all the fibre-yielding Agaves. The following abstract includes the most important:—

*Agave americana*, called century plant, American aloe, carata, pite, magui, and blue aloe. The fibre from this plant is called sisal, pite, ixtle, magui, and Tampico hemp. It is cultivated in Mexico, primarily for the preparation of the national drink, mescal. Pulque is prepared from *A. atrovirens*.

*Agave decipiens*, false sisal. This produces a finer, whiter fibre than the true sisal, but only half as strong. It is sometimes mixed by mistake with sisal in Florida and the Bahamas.

*Agave heteracantha*. The fibre is called pite or ixtle. It forms 90 per cent. of the commercial 'ixtle fibre' from Mexico. The fibres are used instead of bristles and for sacking and rope. The plant is not cultivated in Mexico, and the preparation of the fibre is done by the natives.

*Agave rigida*, var. *elongata*; called saqui or henequen. This is the commonest cultivated Agave in Yucatan. It has a flower-stem no taller than 5 feet. It is an important fibre plant.

*Agave rigida*, var. *sisalana*. This is also called henequen or sisal. The flower-stem is about 20 feet high. It seldom ripens seed, but young plants grow from bulbils on the flower-stalks. It is the most important fibre-bearing Agave.

*Agave vivipara*, called teometl, maguey, Bombay aloe fibre, and Manila aloe fibre. Planted in India, Guam, and the Philippines.

*Agave yuccaefolia*. The fibres are prepared in South and Central America, and come into commerce under the name of pite fibres.



## SCIENCE NOTES.

## Anonas.

There are four fruits of this genus commonly grown in the West India Islands, three of which are indigenous. They have been introduced into other parts of the tropics and subtropics:—

*Anona muricata*, the sour sop of the West Indies. This is a low tree, 8 to 20 feet high, with dark-green, oblong leaves,

large flowers with six long petals, and large, green, conical fruit, covered regularly with bent soft spines. The fruit may weigh from 2 lb. to 4 lb. The white, juicy pulp is pleasantly acid, and is used in the preparation of a cooling drink.

Fig. 8 shows four fruits, the smallest one cut open; also a flower just opening its three thick sepals.

*Anona squamosa*, the sweet sop or sugar apple, called custard apple in India. A low tree with thin, glaucous, oblong-lanceolate leaves, flowers with three small petals, and yellowish-green tuberculate

fruits, shortly conical or globose, 3 or 4 inches long, easily separating into their constituent carpels when ripe. Each dark-brown seed is surrounded with creamy-white sweet pulp. Fig. 9 represents this species.

FIG. 8. SOUR SOP.

(From *The Book of Trinidad*.)

*Anona Cherimolia*, the cherimoya. A subtropical tree, 15 to 30 feet high, which can be grown in the tropics at heights of a few thousand feet. It is probably a native of the elevated regions of north-western South America. It has elliptical or oblong leaves, downy on the under sides, three outer and three minute inner petals, and large, greenish, rounded-ovoid, areolated fruit. The ordinary fruits weigh from 3 lb. to 5 lb., but at Madeira and elsewhere, by careful selection followed by grafting and regular cultivation, almost seedless fruits of 12 lb. to 16 lb. have been grown, which have sold in London for 10s. or more each. This fruit, when well grown, is doubtless the best of the Anonas, and it seems that this result is mainly due to continued selection. It can be grown well in the West India Islands at about 3,000 feet high.

*Anona reticulata*, the custard apple or bullock's heart. This is sometimes called sweet sop in India. A low tree; petals with purple spots, fruit smooth, areolated, rounded or heart-shaped, varying from brownish-red to yellow, 3 to 4 inches across, containing many dark-brown seeds in a white, sweet pulp. There seems no doubt that by selection

its quality might be considerably improved, and its seeds more or less eliminated, and this would perhaps be also the case with the sweet sop.



FIG. 9. SWEET SOP OR SUGAR APPLE.

(From *The Book of Trinidad*.)

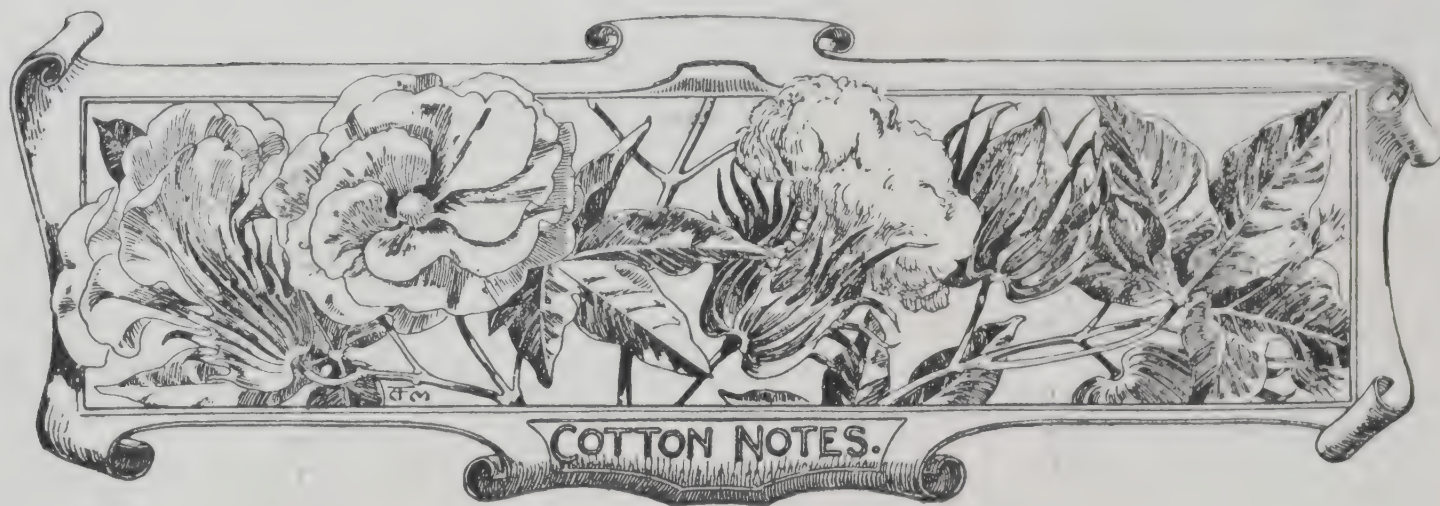
As there is some confusion as to the common names of the Anonas, the following table, showing the West Indian and East Indian names, may be useful:—

	Common name in West Indies.	Common name in East Indies.
<i>A. muricata</i> .	Sour sop.	Sour sop.
<i>A. squamosa</i> .	Sweet sop. Sugar apple.	Custard apple.
<i>A. reticulata</i> .	Custard apple. Bullock's heart.	Sweet sop. Bullock's heart.

There is another tree belonging to this genus to which reference may be made, viz., the alligator apple or monkey apple (*Anona palustris*). This fruit is not usually considered edible, although the Curator of the Botanic Station at Belize states that it is greedily eaten by the natives of British Honduras without any evil consequences.

**Raising new Varieties of Canna.** If the seeds from the best named varieties of French and American Cannas are planted in large quantities, there is the chance of some novelties worth keeping making their appearance, for Cannas do not usually come true from seed. If the varieties are crossed (a remarkably easy operation in the Canna) and the seeds sown, the possibilities seem to be that there may be perhaps 1 or 2 per cent. of novelties. On sowing the seeds of the best of this crossed generation it is probable that fresh novelties may be found. Canna seeds germinate quickly if sown directly they are ripe, before drying.





## WEST INDIAN COTTON.

### Suggestions for Extending and Improving the Industry.

The following correspondence contains important information in reference to the cotton industry:—

*The Imperial Commissioner of Agriculture—to  
Mr. A. H. Dixon.*

Barbados,  
March 28, 1907.

Dear Mr. Dixon,—As you have been good enough to take a keen interest in the Sea Island cotton industry now being carried on in these colonies, I would esteem it a favour, if not giving you too much trouble, if you would be good enough to communicate to me any observations and suggestions that may occur to you in connexion with the position and prospects of the industry.

As you are personally associated with enterprises in which large quantities of Sea Island cotton are regularly utilized, you are in an exceptionally favourable position to advise in regard to the best means of safeguarding the future of the industry, and offering what I am sure will prove valuable hints as to what may best be done for placing the industry in this part of the world on a satisfactory footing.

I would express the hope that you would have no objection to any advice and information that may be given by you being placed within the reach of those concerned.

I am, etc.,  
(Sgd.) D. MORRIS.

*Mr. A. H. Dixon—to the Imperial Commissioner of  
Agriculture.*

Barbados,  
March 30, 1907.

Dear Sir Daniel,—In reply to yours of the 28th. instant, it will give me the greatest pleasure to put on paper the thoughts which occur to me regarding the cotton industry in the West Indies, it being always understood that they are the thoughts of a consumer only, as on agricultural matters in general I must plead absolute ignorance.

As briefly, therefore, as possible I will put on paper the few points that have been forced upon me during my short stay in these colonies. As you know, my present visit was undertaken purely for my health, and thus I have not been able to do very much or to visit as many of the islands as I should have wished; but still both here and at Antigua, thanks to yourself and others connected with the Imperial Department of Agriculture, and to the kindness and courtesy of his Excellency Sir Bickham Sweet-Escott, I have been enabled to see a good deal and also have been privileged

to meet many leading planters and others connected with the industry.

From the standpoint of a consumer my claim to speak is a fairly strong one, as I have the honour to represent the Fine Cotton Spinners' and Doublers' Association of England, who have hitherto consumed, and probably will always continue to consume, the major portion of the total West Indian Sea Island crop. My friend and colleague Mr. E. L. Oliver has told me a great deal about these islands and repeatedly urged me to pay them a visit, in order to see for myself the importance and stability of the industry; thus I feel very much indebted to him and also to you personally, not only for giving me the final inducement to come, but also for your extreme kindness and courtesy to me during my stay.

Mr. J. R. Bovell, who has been a friend indeed, took me over the Barbados Co-operative Cotton Factory, and I have also had the privilege of inspecting the ginning factory belonging to Messrs. H. E. Thorne and Son. In both places the ginning was being most carefully done and with the best results. The cotton left nothing to be desired from a ginning point of view, the staple being uninjured and the seed taken away with very little wastage of lint. I was pleased to find that a serious endeavour is being made to assort and ship the cotton in larger individual lots, inasmuch as it is infinitely easier to induce spinners to buy lots of 25 bags or more than to get them to take little lots of 1, 3, or 5 bags at a time. I quite recognize the difficulty of sorting and grading into larger lots and do not recommend urging this point unless it is absolutely certain that the experience necessary for the purpose is at hand. No more fatal mistake could be made than that of sending badly selected lots, which must inevitably lower the standard of price to the lowest grade shipped in any particular parcel, and also cause want of confidence on the part of the consumer.

As another minor point, I would advise the various growers not to press the bales too severely. If packed under too severe a pressure the cotton is apt to cake, and when it is opened out preparatory to carding and cleaning there is a liability to break and injure the staple. If such a possibility existed as would admit of the spinner receiving the cotton exactly as it leaves the gin, it would suit his purpose admirably, inasmuch as it would save him the necessity of opening it all out again. It is obvious, therefore, that the less it is squeezed beyond a certain point the better. I am open to correction, but I believe the longest stapled Sea Island cotton (similar to the majority of the cotton grown in the West Indies) is still shipped in long bags (not bales), as it is considered that what the planter loses in freight-



charges he gains two or three times over in price.

I have mentioned the above minor points merely as personal views and have purposely left to the last what I cannot but feel to be a grave menace to the prosperous development of the cotton industry in these islands. It is quite evident to me that the whole energy of the planters is being exclusively devoted to the cultivation of the very best and longest staples and that each one vies more or less with the other in growing the longest, strongest, silkiest cotton of the best possible type. This is a most laudable and natural ambition, and is full of good result at the moment when the consumer is confronted with a more than partial failure of the best crops from the Sea Islands in America and an extraordinary demand for the finest goods—a demand which has enabled him to pay cheerfully the phenomenal prices of the present season. But (and this is a very large but)—What will happen should next season bring a normal crop from America and an increased crop from these islands, all more or less of the same type, and if, in addition to this, the demand for these special fine goods is curtailed? It would mean little short of a disaster or, in other words, the accumulation of possibly thousands of bales of cotton in Liverpool or France of an unsaleable quality. The following points must not be forgotten:—(1) That hitherto the total available out-turn of cotton, say,  $2\frac{1}{4}$  inches long, was at the outside 5,000 to 6,000 bales even in a good crop; (2) That these islands are sending 2,000 to 3,000 bales additional of this length and the outlook with the present boom in prices is for nearly double this quantity; (3) That all this finest cotton goes into specialized and valuable goods and is used only and entirely for what is termed a fancy fashion trade.

Further, I would point out most emphatically that, if the trade were to slacken or if the supply of cotton of this length and fineness were to over-lap the demand, it could not be used for any other purpose, because the machinery is not suitable for spinning these extra-long staples and cannot be adapted to them. It is impossible to re-set the machinery for the longer staple, and only a limited number of spindles in England and France *can* spin this cotton. I repeat, too much emphasis cannot be attached to this last statement, as it is worthy of the most careful consideration.

To sum up my remarks, which are not to be considered as in any way pessimistic, I would urge upon all planters concerned to cultivate, side by side with these extra-long staples, a cotton similar to the Carolina cotton (Island seed grown on the mainland) and to the best Florida cotton, which are both of a staple, say,  $1\frac{3}{4}$  inches to  $1\frac{7}{8}$  inches, and of a coarser and harder texture. The same care and attention will have to be taken with the selection of seed, cultivation, and treatment of this medium cotton, to ensure regularity in length of fibre, freedom from nep, lustre, and above all strength, as are necessary in the case of the extra-fine cottons. My reasons for advocating the cultivation of a Florida type of cotton are:—(1) That I believe that the growers would get more lint per acre from this cotton and with less risk of damage; but on this head I am not an expert, and it is merely hearsay gleaned in Charleston and Florida; (2) That they would be assured of a perpetual market and have no anxiety year by year as to the sale of their crops, because the annual consumption of Florida staples is fully ten times as large as that of the superfine staples.

I must apologise for the length of this letter, and I hope that you will believe that it is prompted by a sincere belief that the interests of the planter and the consumer are identical, and by an honest desire to prevent what might be a serious disaster to an industry which has been taken up with such zeal and enthusiasm by the planters in these islands, and, let

me add, assisted so ably by the untiring energy and ability of the Department of which you have the honour to be the head.

If you consider that this letter would be of the slightest service in safeguarding the West Indian cotton industry, you are quite at liberty to publish it.

Yours sincerely,  
(Sgd.) A. H. DIXON,  
Managing Director,  
Fine Cotton Spinners' and Doublers'  
Association, Ltd., Manchester.

## WEST INDIAN COTTON.

Messrs. Wolstenholme & Holland, of Liverpool, write as follows, under date of March 12, in regard to the sales of West Indian Sea Island cotton:—

Since our last report, there has been a moderate demand for West Indian Sea Island at steady rates.

The sales have been of a general character, and include: Barbados,  $19\frac{1}{2}d.$  to  $24d.$ ; Montserrat,  $24d.$ ; Anguilla,  $24d.$ ; Antigua,  $22d.$  to  $24d.$ ; Danish West Indian,  $23d.$

The Charleston planters have recently sold a considerable quantity of extra-fine lots at  $25d.$ , thus supplying spinners with sufficient to make them more independent. There is still a good demand for fine cotton— $22d.$  to  $24d.$ —but above the latter price there is very little inquiry.

We strongly recommend prompt sales, seeing that prices are  $8d.$  to  $10d.$  per lb. dearer than last year. If the demand becomes supplied before the crop is all marketed, the surplus will have to be sold at Florida prices, or carried over till next season, which would be very undesirable.

Because a few retail lots have been sold at  $25d.$  to  $28d.$ , we notice that some planters expect to obtain these figures, quite ignoring the fact that only parcels with superfine staple will command such figures. A little extra fineness often means  $3d.$  to  $6d.$  per lb. over the ordinary.

Present prices, which are higher than for many years, are already curtailing consumption to some extent, and it is fortunate that trade is so very good, otherwise present rates would never have been reached.

## GRAPE CULTURE IN JAMAICA.

The *Bulletin of the Department of Agriculture, Jamaica*, for January 1907, contains a summary of information on the culture of the grape-vine in Jamaica. The following are, briefly, the conclusions:—

- (1) Propagation is easy by two-joint cuttings of thick canes.
- (2) The vines must receive sunlight all or nearly all day.
- (3) The spot should be deeply trenched and manured before planting.
- (4) Plant early in the year.
- (5) In February or March of next year prune back to an eye about 3 inches from the ground.
- (6) Only allow one shoot to grow, pinching side branches to first leaf.
- (7) Provide an arbour for the main stem.
- (8) Prune lateral growths every February back to two or three buds.
- (9) Pinch the unnecessary growths and buds.
- (10) Remove the superfluous bunches.
- (11) Thin the fruit in the bunches.
- (12) Muscat of Alexandria is recommended as the best grape.



## EDITORIAL NOTICES.

Letters and matter for publication, as well as all specimens for naming, should be addressed to the Commissioner, Imperial Department of Agriculture, Barbados.

All applications for copies of the 'Agricultural News' should be addressed to the Agents, and not to the Department.

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# Agricultural News

VOL. VI. SATURDAY, APRIL 6, 1907. No. 129.

## NOTES AND COMMENTS.

### Contents of Present Issue.

The editorial in this issue discusses the future of the cotton industry in the West Indies in view of the important points raised by Mr. A. H. Dixon in a letter published on pp. 102-3. Mr. Dixon represents an Association which consumes annually about 80,000 bales of cotton of various grades (chiefly fine and medium qualities) of the value of about two million sterling.

Some of the principal fungus diseases of the sugar-cane in Hawaii are discussed in a note on p. 99.

Brief descriptions, with illustrations, of the different Anonas known in the West Indies will be found on p. 101.

On p. 106 there appears a note on crickets, dealing with mole crickets, field crickets, and house crickets.

Successful Agricultural Shows were held at St. Kitt's and Grenada recently. The latter was attended by the Imperial Commissioner of Agriculture, who presented the prizes and delivered an address (p. 107).

A useful statement as to the position of sugar on the Canadian market under the new tariff is published on p. 110.

A petition has been sent to His Majesty the King by the Barbados Legislature, praying for the continuance of the Brussels Convention (pp. 110-1).

### Jamaica Bananas in England.

In a long article in the *London Daily Telegraph* on the Jamaica banana industry, the writer refers to this fruit as eminently suited to the popular taste, for 'it is cheaper even than the potato.'

London, it is said, is the only city in the British Isles in which the Jamaica banana has not become popular among the very highest class of fruiterers. The fault is not with the banana, but with the method of handling the fruit. A Jamaica banana is not perfectly ripe when presenting a golden-coloured skin with a pretty green tip; it is at the correct stage of maturity when the skin is distinctly discoloured or even slightly spotted. It is difficult, however, to persuade the majority of consumers that fruit can be palatable and at the same time unsightly. Yet this is essentially the case with Jamaica bananas.

### Cocoa-nuts.

The *Tropical Agriculturist*, referring to the remarkable dearth of literature on the subject of cocoa-nuts, says: 'The cultivation of this palm is continually extending in Ceylon, Malaya, and other countries, but the consumption increases as rapidly, so that prices have not fallen; in fact, they have of late risen in a remarkable way.'

The scientific treatment of the cocoa-nut is only in its infancy, and there is therefore available very little accurate information as to most branches of its cultivation and harvesting. 'What kind of nut, for instance, gives, for each kind of soil, the best results as to copra, oil, fibre, etc.? How many really distinct varieties are there? To what extent can the qualities of any race be improved by selection? What is the best distance apart to plant different varieties in different soils? What is the manure for each kind of soil? What is the best way of making copra of uniform quality, fibre, oil, etc.? and many other questions.'

### Rubber Experiment Station in British Guiana.

At a meeting of the British Guiana Board of Agriculture on March 22, his Excellency the Governor stated that he had asked the members of the Combined Court to vote the necessary expenditure for the establishment of a rubber experiment station in the North-west district. The idea of the proposal was to ascertain what kinds of rubber trees could best be cultivated in British Guiana.

Sir Frederic Hodgson expressed the opinion that everything pointed to the fact that *Sapium* trees, which were indigenous to the colony, were the plants best suited to the conditions in British Guiana. There were several species of *Sapium*, and the station would have to show which would be the best to cultivate. It would also be able to distribute seedlings to persons who wished to cultivate rubber.

It was further stated that the Government was considering proposals for having the forest resources of the colony thoroughly examined, especially as to its supply of rubber, balata, and timber.



## Japanese Ginger.

In connexion with the position of Jamaica ginger in the London market, referred to in Mr. Jackson's monthly report (p. 111), the following notes from a report of the Canadian commercial agent at Yokohama on the ginger industry of Japan may be of interest. It is stated that ginger is largely produced in Shiznoka prefecture and was first exported about twenty years ago. Owing to deterioration of quality, the export almost entirely stopped.

In recent years, however, by more skilled methods, the quality has much improved; the export trade has revived and cultivation is carried on more extensively, with the prospect of rapid advancement. In 1905, the total area of land devoted to ginger in the prefecture was about 8,025 acres, which produced 2,833,333 lb., valued at about £19,120. The dried ginger is exported chiefly to the United States, some going to Europe and India.

In Japan the demand for ginger is limited, the consumption not exceeding 40,000 lb. a year for medicinal purposes, in addition to a small quantity used for seasoning food. The producers in Shiznoka are said to be trying to improve the quality and quantity with a view to displacing West Indian and Cuban ginger on the foreign markets, but they have a difficult task before them.

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## Agricultural Credit in France.

It is stated in the New Zealand *Farmer* that it is only recently that agricultural banks have begun to be introduced into France. This is the more surprising because France is essentially a country of small holders, and systems of agricultural credit are more than usually advantageous to the small farmer.

The fact remains, however, that it is not only the small farmer who benefits when a credit society is formed; the better-off find it profitable and convenient to have recourse to a bank, which often obviates the necessity of selling crops when prices are unfavourable, or selling stock in an unfinished condition.

In 1893, rural banks were established in France on the Raiffeisen principle of unlimited liability of the members for the debts of the society, and in 1901 there were 543 of these associations federated in a central society. Another form of agricultural bank exists, based on the unlimited liability of members, but with a variable capital, each member subscribing for one share. These societies are combined in a central federation, which, in 1902, embraced 340 societies.

In order to encourage agricultural credit, a law was passed in 1899, which provides for advances from State funds, free of interest, to the direct or regional banks.

The system of agricultural credit favoured by the French Department of Agriculture is based, not on the Raiffeisen principle of unlimited liability, but on co-operation with limited liability, the subscriptions of persons interested, together with the assistance afforded by the State, enabling loans to be made by the district bank.

## Cayman Islands

The Cayman Islands form a dependency of the colony of Jamaica. The largest of the three islands is Grand Cayman, which is 17 miles in greatest length and 4 to 7 miles broad. The island is well wooded, and the thatch palm grows in abundance.

A report on the dependency, for the year ended September 30, 1906, has recently been published as *Colonial Reports—Miscellaneous*, No. 39. From this it appears that the chief items of export are turtle and turtle-shell, rope, cattle and horses, dried skins, logwood, cocoa-nuts, pink pearls, and conch shells.

The value of the exports of turtle during the year was £5,657, of turtle-shell £1,543. Of rope, made from the thatch palm, 586,500 fathoms were exported, of the value of £586. The output of rope has been gradually increasing for the last five years. There are about 3,000 acres in grass in Grand Cayman, on which cattle and horses are reared. During the year, £577 worth were exported, as compared with £1,337 in 1904-5. Cocoa-nuts are grown chiefly in Cayman Brac and Little Cayman, where the plantations are steadily increasing. Last year, 1,558,000 nuts were exported, valued at £6,232. Nearly all the cocoa-nut trees in Grand Cayman have been killed by the bud-rot disease.

The Cayman Islanders build their own schooners, all the timbers being made of local mahogany.

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## Introduction of Economic Plants into Ceylon.

There is an interesting paper in *Science Progress* (October 1906) on the 'Progress of botanical and agricultural science in Ceylon,' by Dr. J. C. Willis, Director of the Royal Botanic Gardens. Dr. Willis points out that it is difficult to realize how small a number of useful plants existed in any tropical country prior to the arrival of Europeans. Moreover, agriculture was practised only so far as was necessary for the actual subsistence of the people.

Taking the case of Ceylon, the introduction of many useful plants from the West Indies was effected by the Portuguese settlers and merchants. Among the plants brought by them to Ceylon before 1678 are mentioned the guava, pine-apple, chillies, coffee, papaw, rose apple (*Eugenia Jambos*), Malay apple (*E. malaccensis*), pigeon pea, cotton, custard apple, etc.

A further large number of useful plants were introduced into Ceylon during the rule of the Dutch. They established gardens for the purpose of introducing and acclimatizing useful plants from other countries. Many of the plants introduced by the Portuguese and the Dutch are now so universally cultivated in Ceylon that no one would suppose them to be other than native. As examples, take the papaw, the guava, the pine-apple, and the cassava.

Under British rule, the most conspicuously successful work was done by Thwaites (1849-80). Nearly all the useful plants of Ceylon, except those previously acclimatized, were introduced during his tenure of office. The best known is cinchona, while Ceara and Para rubber were also imported in his time.





## INSECT NOTES.

### Crickets.

Crickets belong to the same natural order of insects as the grasshoppers, locusts, cockroaches, etc., all of which are included under the name Orthoptera.

The insects of this order have two pairs of wings; the first pair overlap when at rest, and the second pair are thin and membranous, and are folded in longitudinal pleats like a fan. They have biting mouth-parts, and the metamorphosis is incomplete, that is, the young insect is of the same general structure and appearance as the adult, except for its smaller size and the absence of wings.

The crickets belong to the family Gryllidae, which is represented in the West Indies by the mole crickets, the field crickets, and the house crickets.

The mole crickets have been described and figured in previous numbers of the *Agricultural News* (Vol. II, pp. 104, 200, and 298, Vol. III, p. 208, Vol. IV, p. 282, and Vol. V, p. 122), and the name given as *Scapteriscus didactylus*. In addition to this species, which has a very general distribution, there are at least two other species of mole cricket known in the West Indies, *Scapteriscus variegatus* (Barbados and St. Lucia) and *Gryllotalpa hexadactyla* (Barbados, St. Vincent, Grenada, Montserrat, and Guadeloupe).

The field cricket (*Gryllus assimilis*) is recorded from Barbados, St. Vincent, Grenada, St. Lucia, Martinique, and Dominica, also from Cuba, Mexico, and Central and South America. It is probably the same species that occurs in the other British West India Islands as the common field cricket. This insect is from  $\frac{3}{4}$  inch to  $\frac{7}{8}$  inch in length, dark-brown or light-brown in colour; the antennae are nearly twice the length of the body. The outer wings are shorter than the body, but the inner pair extend back beyond the end of the abdomen in two narrow projections. It is found in grass fields or uncultivated land, and sometimes invades cultivations, especially when lands long uncultivated are planted up. In Nevis, during 1906, considerable damage was done to young cotton by this cricket, which ate off the seedlings when only a few days old.

Although many people living in the West Indies are probably familiar with the appearance of the field cricket, it is likely that a greater number know it merely by the call of the male. In the evening, during the short twilight that follows sunset, the peculiar shrill call from some grass field may be heard, very sharp, and strident, high pitched and long drawn out. It is most conspicuous in Barbados in the dry season, when there are but few calls of the whistling frog to be heard. The field crickets are nearly always vegetable feeders, like their near relatives the mole crickets, the grasshoppers, and the locusts, and, when they occur in sufficient numbers, are capable of considerable injury to growing crops. They are always likely to be more plentiful and more destructive in lands newly brought into cultivation and in lands surrounded by large uncultivated areas.

For dealing with crickets when they become pests in the field, the poisoned bait recommended for the cut worm will be found useful. This bait is made of 25 lb. to 50 lb. of bran

or pollard to 1 lb. of Paris green, thoroughly mixed and stirred to a thick mash with molasses and water. It is distributed in the field near plants that are being attacked, about a tablespoonful in each spot.

The house cricket in Barbados (*Amphiacusta caribea*) is striking in appearance on account of its very long antennae, and long legs. The colour of the house cricket is a light-brown, mottled with spots of lighter and darker shades of brown. The body of the adult is about  $\frac{1}{2}$  inch to  $\frac{3}{4}$  inch in length, while the hind legs are about  $1\frac{1}{2}$  inches, and the very slender thread-like antennae are about  $3\frac{1}{2}$  inches long. The legs are banded light and dark-brown. The female is wingless, or rather the wings are represented by very small pads on the thorax, while the wings of the male are about half the length of the abdomen. The call of the male differs from that of the field cricket in being of less volume, and composed of short notes in rapid succession. In houses it frequents book-shelves, piles of old papers, etc., and it is probably responsible for a certain portion of the damage to books and papers ordinarily attributed to cockroaches. In captivity these crickets feed on bread, banana, etc. The house cricket is also found in sheds and outbuildings.

Books that have been treated with the book solution (consisting of corrosive sublimate, 2 oz.; carbolic acid, 2 oz.; and methylated or rum spirit, 2 pints) will be protected from the attacks of the cricket as well as from cockroaches.

### ST. KITT'S AGRICULTURAL SHOW.

The St. Kitt's *Advertiser*, of March 12, contains a report on the Agricultural Show held under the auspices of the Imperial Department of Agriculture and the Agricultural and Commercial Society on March 11, from which the following is extracted:—

Great pains had been taken by the Secretary of the Society (Mr. F. R. Shepherd) to make the show a success, and it is largely due to his efforts that it turned out so creditably. Comparing the show with its predecessors, it was certainly lacking in some respects, local industries, small stock, and horticultural exhibits not being so much in evidence, and there was a regrettable absence of interest on the part of the peasant class.

Among the exhibits, horned cattle probably made the best show. There were several fine specimens of half-bred Zebu bulls and steers. Considering the extent to which our best ponies and horses are exported, the show of horse-flesh was indeed creditable. Small stock and poultry were not largely represented, though among the latter were some excellent specimens.

Cane and cotton were well represented, and there were a fair display of vegetables and preserves and some beautiful collections of flowers and roses. Some of the stores made exhibits of agricultural implements, saddlery, and hardware.

Perhaps the most attractive feature of the show to the general public was the exhibition of horses and ponies in the riding and driving classes.

Mention should be made of the excellent teams of working oxen and mules from the Pond and College estates. It would be well if more of our estates could boast of such fine beasts.

On the whole, the show can be said to have been a creditable one, and if the Society would lessen the labours of the energetic Secretary by the appointment of officers to assist in arrangements, future shows will not be lacking in the one or two particulars that detracted from the merits of the 1907 exhibition.



## AGRICULTURAL SHOW AT GRENADA.

A very successful Agricultural Show was held by the Agricultural and Commercial Society, under the auspices of the Imperial Department of Agriculture, at Telescope, St. Andrew's, Grenada, on February 14 and 15 last.

The show was opened by his Excellency the Governor, who congratulated the Hon. G. S. Seton-Browne and the managing committee on the splendid success they had achieved by energy and co-operation. After pointing out the benefits to be derived from agricultural shows, his Excellency referred to the valuable services to the West Indies of Sir Daniel Morris and the Imperial Department of Agriculture.

The prizes were presented to the winners by the Hon. Sir Daniel Morris, K.C.M.G., Imperial Commissioner of Agriculture. The following exhibitors received the Diploma of Merit of the Department:—

Mr. F. Kent, for a stallion horse.

Rev. G. W. Branch, for the best native-bred mule.

Mrs. McEwen, for a choice exhibit of citrus fruits.

Mr. C. A. Edwards, for a fine sample of peasant's cacao.

Mr. G. S. Aberdeen, for a fine peasant's colt.

Joseph Peters, for a handsome peasant's milch cow.

Patterson Mark, for a fine native heifer.

Mary Elizabeth Thomas, for an exhibit of cassava cakes.

Bellevue estate manager (Mr. R. J. Greaves) for an exhibit of artificially dried mace.

Mr. T. L. Smith, of Nianganfoix, for a specially interesting exhibit of garden vegetables.

Mrs. G. S. Seton-Browne, for a fine exhibit of imported and native-bred poultry.

Mr. G. Rennie was also presented with a diploma for his valuable assistance and in allowing the show to be held at Telescope estate.

Sir Daniel Morris delivered an address in which he expressed the opinion that this Agricultural Show of 1907 at Grenville was the best he had yet attended in Grenada. He heartily congratulated the Agricultural and Commercial Society and the executive committee on the success of their efforts. The show was interesting in every class, but the exhibits of stock were especially good. The peasant proprietors also were numerous prize winners, showing they were realizing the value of the shows, and taking an active part in the present improvement in agricultural matters in the colony.

### CHARACTER OF EXHIBITS.

Continuing a review of the show, the Imperial Commissioner stated that the exhibits of horse-kind were equal to anything in the West Indies. The bulls on exhibition were not good, but there were fair working oxen and some really good milch cows and heifers. The pigs were rather poor; they were large, but not of good breed, and not the most economical and productive for food purposes. Some of the poultry were good, but the exhibits were not numerous, and they were not well shown. The exhibits of sheep, goats, and poultry amongst peasant proprietors were disappointing, and it was suggested that the Agricultural and Commercial Society might assist by introducing pedigree animals and placing them within easy reach of the people in the country districts. Mention was made of Plymouth Rocks as possibly the best all-round table birds, and of White Leghorns for eggs. Also it was recommended to introduce Belgian hares as a hardy and profitable breed of rabbits, giving excellent results for table purposes. The exhibits of citrus fruits were good. In some instances the fruits had not been carefully gathered and

some of the torn stalks were still attached to them. In one case the fruit was covered with black blight, showing that little or no care had been taken in preparing it for exhibition. The ground provisions, including yams, sweet potatoes, and Indian corn, were well represented; also choice garden vegetables and preserves were shown by Mrs. Sharpe and others.

### INFLUENCE OF SHOWS.

It was evident that the educational influence of these shows was gradually, but surely, spreading. Mere spasmodic efforts were declared to be useless. The work should be carried on steadily and faithfully, and with the hearty co-operation of all sections of the community. The aim of these shows was to stimulate greater attention to raising the standard of quality, and to increase the quantity of the exports of the colony. At the same time it was important to devote attention also to raising ground provisions and other food crops, a matter which had been so forcibly urged in the address delivered by his Excellency, also to keeping milch cows to supply milk and butter, and raising poultry for the table and for the production of eggs. An all-round agricultural community was the most prosperous and therefore the happiest, and this should be the aim of all interested in the future welfare of the colony. The officers connected with the local Department of Agriculture were devoted to their duties, and at all times accessible to those who desired their services as advisers on the treatment of the soil, on dealing with diseases, and in advancing agriculture generally.

### AGRICULTURAL EDUCATION.

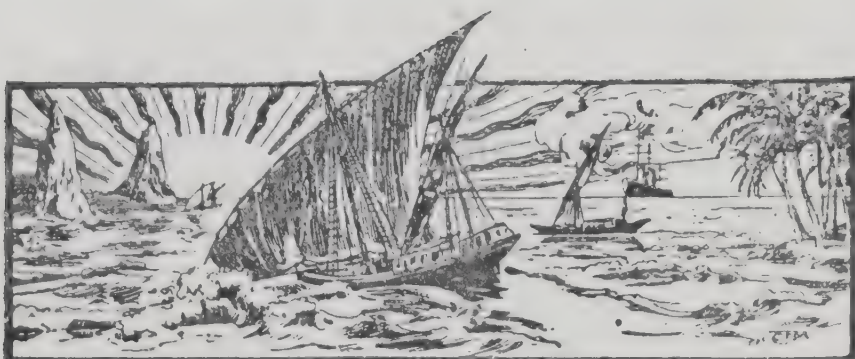
In his closing remarks the speaker advocated the more general education of the young in closer sympathy with the cultivation of the soil, and the care and good keeping of animals. He once more urged the establishment of an Agricultural School in the colony, where young men, natives of the island, could receive a sound practical training in agriculture and be fitted for taking their places among the progressive planters of the future. Grenada was behind the other islands in this respect. He earnestly hoped it would not continue to be so.

### PRIZE-HOLDINGS SCHEME.

Attention was drawn to the scheme of prize holdings in the parish of St. John, started with the co-operation of the Agricultural and Commercial Society and the Imperial Department of Agriculture. A sum of £25 contributed by the Imperial Department had been offered in twelve or more prizes for competition amongst peasant proprietors, who, during the year 1906, had shown the greatest improvement in their cacao fields. The holdings were inspected at the beginning of the year and again at the close of the year, and marks were awarded according to the degree of cleanliness of the cultivation, the character of the draining, forking, bedding, pruning, and care in picking the crops. The judges had recently sent in their report, which was most satisfactory. The extension of this prize-holdings scheme was likely to have a beneficial influence in improving peasants' holdings, and he begged for the scheme the warm support of the Government.

In conclusion, Sir Daniel Morris expressed the great pleasure it afforded them all to welcome his Excellency the Governor among them. His Excellency took a deep interest in agricultural progress, and with the united efforts of its people, the future of Grenada should be as bright, if not brighter, than at any period of its history.





## GLEANINGS.

In 1906 nearly 80,000 tons of sugar were made from the wild date palm (*Phoenix sylvestris*) and over 3,000 tons from the Palmyra palm (*Borassus flabellifer*) in Bengal.

The Port Royal Mountains Branch of the Jamaica Agricultural Society proposes to lay out and maintain a model market garden on its permanent Agricultural Show grounds.

According to the *Avis*, the sugar crop for the greater part of the island of St. Croix is likely to be exceedingly good. The Central Factory commenced operations in the middle of February.

At a meeting of the British Guiana Board of Agriculture on March 22, it was decided that a fumigating chamber should be obtained for dealing with economic plants coming from infected countries.

Mr. Conrad Watson, who has for several years been attorney in Montserrat for Mr. Paget Wade, of St. Kitt's, has been appointed to a similar position in Jamaica on estates of the Earl of Dudley. Mr. Watson was one of the pioneers of the cotton industry in Montserrat.

According to the *Montserrat Herald*, it would appear that 'the area to be planted in cotton during the present season will exceed all previous records. The Montserrat Company, Limited, are going in extensively for the industry at Woodlands. The contagion has reached the far north, where the peasantry are taking to cotton in real good earnest.'

The Agricultural Superintendent in St. Lucia states: 'As indicating the growing attention to the planting of limes, I am able to report that orders for over 100,000 plants have been received at my office. These plants are required for the coming planting season, and every effort is being made to raise them without unnecessary delay.'

A Bill has been prepared and will be introduced into the British Guiana Court of Policy, providing for the establishment of a Government Industrial School to be 'maintained for the proper instruction and training of vagrant boys and of youthful male offenders, who shall, as far as practicable, be there employed in agricultural pursuits.'

The Agricultural Superintendent at Grenada reports that on the coastal cacao estates large quantities of sea-weed are used, its manurial value being generally recognized by planters. He recommends that it should be placed in the cattle pens and allowed to rot down with the other manure before being applied to the trees.

With reference to the article on 'male' or seedless cocoa-nuts in the last issue of the *Agricultural News* (p. 87), it is regretted that, after this number had been passed for press, one of the blocks (fig. 6) was turned upside-down.

The common water-cress (*Nasturtium officinale*) grows along rivulets in many of the West India Islands. The American cress (*Lepidium virginicum*) is a common weed in some of them. If cultivated, the young leaves of the latter would probably make a good salad.

It is not generally known that any one attending to bees may escape many stings by first thoroughly washing their hands, and then rubbing them all over with a little pure bees'-wax. This prevents any odour from the hands being noticed by the bees. The scent from bees'-wax attracts a bee's attention very strongly, and seems to deprive it of any hostility or bad temper. (*Natal Agricultural Journal*.)

With reference to the shipment of 39½ lb. of Castilloa rubber from St. Lucia (see *Agricultural News*, Vol. VI, p. 12), Mr. G. S. Hudson reports that a sale was effected in London at 3s. 10½d. per lb., the shipment netting £6 6s. 8d. The brokers suggested that the rubber should be cured in thinner pieces, 'as the interior of the present shipment is white and insufficiently cured.'

In reference to the suggestion that native woods should be employed in the re-building of Kingston (see *Agricultural News*, Vol. VI, p. 71), the *Jamaica Daily Gleaner*, of February 26, contains a letter from the Assistant Director of Public Works, stating that certain native woods would be acceptable as scantling for public buildings. Hard-wood shingles made from local woods would also find favour, if furnished at a reasonable price.

Addressing the Legislative Council of St. Kitt's-Nevis on February 27, his Honour the Administrator referred to the cotton industry of Anguilla as follows: 'Anguilla is showing remarkable energy in the cultivation of this increasingly valuable product. The export in 1906 was 170 per cent. in excess of the export in 1905, and as cultivation is extending and improved arrangements for ginning are now adopted, that little island bids fair to increase largely its material prosperity.'

In *Circular No. 14* (Vol. III) of the Royal Botanic Gardens, Ceylon, it is stated that the mangosteen grows in 'wet Ceylon' below 2,000 feet. It usually bears no fruit until it is eight or nine years old. Its fruits are sold at 1d. each. The durian also grows in the wet, low country, and its large fruits may be sold for 1s. or more in Ceylon during July and August. The largest and best mango commonly grown in Ceylon is the 'Rupree Mango,' the fruits of which sell locally for 3d. or so each.

In a review in the *Journal of the Royal Colonial Institute* of Mr. Symmington Grieve's *Notes upon the Island of Dominica*, it is stated: 'The development of the various West India Islands has been very marked since the establishment of the Imperial Department of Agriculture for the West Indies, which is presided over by Sir Daniel Morris, who has done so much individually to further the extension of trade and settlement. Dominica has been by no means behind in taking advantage of the assistance rendered by the Department, with the result that settlement is proceeding, and more land is being brought under cultivation.'





## WEST INDIAN AGRICULTURAL CONFERENCE, 1907.

The following correspondence relative to the West Indian Agricultural Conference at Jamaica is published for general information:—

*The President, West Indian Agricultural Conference—to the Colonial Office.*

Jamaica,

January 14, 1907.

Sir,—I have the honour to enclose, herewith, a copy of a resolution unanimously passed by the members of the West Indian Agricultural Conference assembled at Jamaica on January 14 last, communicated to his Excellency the Governor to be forwarded to the Right Honourable the Secretary of State for the Colonies.

2. Owing to the occurrence of the disastrous earthquake that took place on the day the resolution was passed, it is probable that the Governor may have been unable to forward the resolution by cable; I therefore forward a copy for such action as may be considered desirable.

I have, etc.,

(Sgd.) D. MORRIS.

*Copy of a Resolution unanimously passed by the Members of the West Indian Agricultural Conference assembled at Jamaica on January 14, 1907.*

We, the members of the West Indian Agricultural Conference assembled at Jamaica, desire to express our humble loyalty to Your Majesty's person and throne and the hope that during Your Majesty's happy reign the West Indian Colonies may again be amongst the most prosperous of Your Majesty's Dominions.

*The Colonial Office—to the Imperial Commissioner of Agriculture.*

Downing Street,

February 28, 1907.

Sir,—I am directed by the Earl of Elgin to inform you that he has had the honour to lay at the foot of the Throne the resolution passed by the members of the West Indian Agricultural Conference at Jamaica which was enclosed in your letter of January 14, and that His Majesty was pleased to receive the resolution very graciously.

I am, etc.,

(Sgd.) C. P. LUCAS.

*The Colonial Office—to the Imperial Commissioner of Agriculture.*

Downing Street,

February 28, 1907.

Sir,—I am directed by the Earl of Elgin to acknowledge the receipt of your letter No. S. S. 487 of February 7, reporting on the West Indian Agricultural Conference at Jamaica.

2. Lord Elgin has caused letters of thanks to be addressed to the gentlemen specified in the 14th. paragraph of your letter, and I am to express his Lordship's high appreciation of the arrangements which you had made for what promised to be an unprecedentedly interesting and successful gathering.

I am, etc.,

(Sgd.) C. P. LUCAS.

## SCRUBBING TREE BARKS.

The following note from *Tropical Life* deals with the use of the brush in freeing cacao and other trees from epiphytes, mosses, etc.:—

Cacao, tea, and other planters often complain of the trouble they have to keep the bark of their trees and plants clean, either to discourage the spread of disease and pests, or by removing the moss and epiphytes, to prevent the bark becoming damp and rotten.

To help in the matter, the largest firm of brush-makers in London have been turning out tree-scrubbing brushes after designs suggested by the editor of *Tropical Life*. These scrubbers have been shipped to all parts of the world, and can be obtained either with stiff bass fibre or a flat wire scrubbing surface.

The advantages of these brushes will at once be apparent to all practical cacao planters and others, particularly those with estates situated in the damper and more shady districts, where mosses, ferns, and other epiphytes are very liable to appear on the stems and branches, but which must be removed at once, as they will otherwise injure the trees and prevent the delicate flowers from coming out properly. With cacao the B brushes [with attachments for long handles] are the only ones that can be used for properly cleaning the upper parts of trees from the moss, etc., without climbing the trunks and destroying all chances of a good crop of pods. For this purpose the scrubber is made with a solid round back, with a hole for the stick or bamboo, the same as with cacao pruners, to manipulate it with from the ground, and when not required for cleaning the upper part of the trees, if the stick is removed, it will be found that the round back gives an excellent purchase for the hand to grip and use as an ordinary hand scrubber, especially if a band is tacked across the back, as with a dandy brush.

The nose of the brush is pointed and fined down, in order to obtain easy access to the numerous nooks and forks in the trees, which otherwise it would be impossible to get at. The brushes are made of the best and stiffest wire or bass and prime beech stocks, and, therefore, with fair usage, will be found to wear well and give general satisfaction to the user.

## AGRICULTURAL PROGRESS IN THE LEEWARD ISLANDS.

In the course of an interview with a representative of the *Morning Post*, the Bishop of Antigua (the Right Rev. Dr. Walter Farrar) said:—

Excellent work is being done by the Imperial Department of Agriculture for the West Indies under Sir Daniel Morris. Sir Daniel's representative in the Antigua group, Dr. Watts, an expert agricultural chemist, has been indefatigable in his efforts to establish, on a modern basis, the old industries, and to introduce new ones into the islands. The sugar plantations still manage to maintain their existence in Antigua, and the erection of central sugar factories promises to give a new lease of life to the industry. In Montserrat the plantations of lime trees suffered very serious damage during the last hurricane, but the devastated areas are being replanted, and here, as in Antigua and other islands, cotton growing is being taken up on an increasingly large scale. Indeed, in the attention which is being paid to the cultivation of cotton, under the stimulus of the British cotton-growing movement, may be found the cause of much of the new hopefulness with which the future is being faced in the Leeward Islands.



## CANADIAN SUGAR TARIFF.

Messrs. Robert Crooks, & Co., of Montreal, have forwarded the following statement showing the customs duties to be paid on sugars under the British preferential and the general tariffs, respectively:—

As finally amended and passed by Parliament on March 5, 1907, effective from date of original revision, November 29, 1906, the tariff provides that customs' duties shall be charged as follows:—

Above 16 D.S. and all refined testing not more than 88° per 100 lb.:—

Preferential, 72c.; general, \$1.08  
and for each additional degree, or over  $\frac{1}{2}$  a degree, over 88° per 100 lb.:—

Preferential, 1c.; general, 1 $\frac{1}{2}$ c.

Refined shall only be entitled to British preferential rate when made wholly from British-grown raw sugar.

Not above 16 D.S. testing over 56° and not more than 75° polarization per 100 lb.:—

Preferential, 31 $\frac{1}{2}$ c.; general, 52c.  
and for each additional degree, or over  $\frac{1}{2}$  a degree, over 75° per 100 lb.:—

Preferential, 1c.; general, 1 $\frac{1}{2}$ c.

All raw sugar of British growth shall be entitled to entry under the British preferential tariff when imported direct into Canada from any British colony or possession.

Shipments will be allowed entry under the preferential tariff, when, 'for the time being,' consigned on through bill of lading via the United States to a place in Canada from a country entitled to the provisions of the preferential tariff, and the produce of such country, and provided that the sugar shall not be entered for consumption or for warehouse in the United States, but shall only remain in that country for the purpose of transshipment.

The bill of lading requires to show that the goods were consigned to a place in Canada without contingency of diversion.

## COMPARISON OF DUTIES IN PRESENT TARIFF WITH OLD RATES IN TARIFF PRIOR TO NOVEMBER 29, 1906.

	Imported Granulated. Preferential Tariff Duty 100°.	Raws. Preferen- tial Duty 96°.	Difference.
New tariff	84c.	52 $\frac{1}{2}$ c.	31 $\frac{1}{2}$ c.
Old tariff	85 $\frac{1}{2}$ c.	47 $\frac{3}{4}$ c.	37 $\frac{3}{4}$ c.
New tariff reduces refiners' protection			6 $\frac{1}{6}$ c.

## COMPARISON OF PREFERENCE TO BRITISH-GROWN RAW SUGAR IN NEW WITH OLD TARIFF.

		General Duty.	Preferential Duty.	Preference.
Basis 96°				
New tariff	— —	83 $\frac{1}{2}$ c.	52 $\frac{1}{2}$ c.	31c.
Old tariff	— —	71 $\frac{1}{2}$ c.	47 $\frac{3}{4}$ c.	23 $\frac{5}{8}$ c.
Increase in new tariff—	12c.		4 $\frac{5}{8}$ c.	7 $\frac{1}{6}$ c.
Basis 89°				
New tariff	— —	73c.	45 $\frac{1}{2}$ c.	27 $\frac{1}{2}$ c.
Old tariff	— —	61c.	40 $\frac{3}{4}$ c.	20 $\frac{1}{4}$ c.
Increase in new tariff—	12c.		4 $\frac{5}{8}$ c.	7 $\frac{1}{6}$ c.

## CANADIAN BEET FACTORIES' NEW PROVISION.

For every 1 lb. of refined sugar produced by each factory in Canada from Canadian-grown beets, it will be permitted to import 2 lb. of foreign raw beet sugar at the British preferential rate of duty for three years.

The three domestic beet factories for the season 1906 produced from Canadian-grown beets 25,456,819 lb. of refined sugar. The factories are situated at, and produced separately: Wallaceburg, Ontario, 11,276,066 lb.; Berlin, Ontario, 9,510,753 lb.; Raymond, Alberta, 4,670,000 lb.

Alberta is debarred from the advantages of the new tariff by its location, but if the two factories in Ontario availed of the full privilege, they could import about 18,500 tons foreign raw beet sugar in 1907.

German raw beet sugar is subject to a surtax of one-third of the preferential duty under this provision.

## CONSUMPTION OF SUGAR IN CANADA.

For the fiscal year ended June 30, 1906, the following quantities were entered at Customs for home consumption: imported refined, 28,532,913 lb.; raws, 420,429,610 lb.; total, 448,962,523 lb.

## BRUSSELS CONVENTION.

The following is the text of a petition to His Majesty the King with reference to the Brussels Convention, drawn up by a joint committee of the Barbados Legislature:—

*To the King's Most Excellent Majesty.*

The humble petition of the Legislature of Your Majesty's ancient and loyal island of Barbados

*Respectfully sheweth:—*

1. That the island of Barbados is one of the oldest colonies of the British Empire, and contains nearly 200,000 inhabitants, by far the greater proportion of which consists of the agricultural class who are the natives of Africa brought under the laws of England and settled upon the sugar plantations.

2. That in spite of the cultivation of cotton, which has of late been successfully revived as a subsidiary agricultural industry in those parts of the island suitable for its growth, the entire population still depends for subsistence upon the sugar industry.

3. That the Royal Commission of 1897, in their report on the condition of the prospects of Barbados, recognized that the sugar industry was the only industry capable of supporting its dense population, and declared that if nothing was done to help that industry, there was a certainty of great distress and considerable expenditure to relieve it.

4. That for many years prior to 1903, the year in which the Brussels Convention was signed, the sugar industry had been struggling against the competition of beet sugar produced upon the continent of Europe under the system of bounties and cartels.

5. That prior to the Convention all British Governments for forty years had desired to abolish sugar bounties, and it was only the assured hope that justice would be done that encouraged the continued cultivation of sugar plantations in this island.

6. That Your Majesty's petitioners are aware that Your Majesty fully realized the injustice of the continental bounties and cartels, when reference was made by Your Majesty, in the speech from the throne at the opening of Parliament in 1902, to the fact that Your Majesty's subjects in the West Indian Colonies 'had been too long unfairly weighted in the past.'

7. That the Convention has not caused a rise in the price of sugar in England, but its effect has been gradually to restore freedom of trade in the markets of the world.

8. That although the results of the Convention are more



apparent in some other of Your Majesty's West Indian possessions, where large amounts of capital have during the last three years been invested in the sugar industry, than in Barbados, yet Your Majesty's petitioners see clearly the beneficial effects of the Convention to themselves, in the renewal of confidence in the one industry on which the entire people of this island mainly depend.

9. That since the Convention has come into operation the beneficial effects of the stability of the industry, inasmuch as it is now based on the principles of supply and demand, instead of being at the mercy of foreign caprice, are shown by the purchases of estates at improved prices, not only by local buyers, but by investors from England and North and South America, by the efforts of proprietors to make a higher and better class of sugar than formerly, involving the introduction of new and improved machinery, and, generally, by the active interest taken in all experiments incident to the cultivation of the sugar-cane.

10. That in the event of Your Majesty's Government deciding to withdraw from the Brussels Convention, although it may be unlikely that the continental bounties will be restored, yet the high protective duties which render cartels possible and effective would undoubtedly be renewed, and the sugar industry cannot compete with continental sugar thus artificially cheapened.

11. That the effect of the withdrawal of Your Majesty's Government from the Convention would assuredly be to thrust back the sugar industry to the moribund state in which it was found at the time of the Royal Commission of 1897, in other words, would involve the certain ruin of that industry.

12. That Your Majesty's petitioners, with such a possibility in view, feel that a very grave responsibility rests on them with respect to the future of the inhabitants of the island of Barbados.

Wherefore Your Majesty's humble and loyal petitioners, the Legislature of Your Majesty's ancient colony of Barbados, most dutifully approach the throne, and pray that Your Majesty will be pleased to influence Your Majesty's Government to take such measures as will lead to the continuance of the Brussels Convention.

And Your Majesty's Petitioners as in duty bound will ever pray, etc., etc.

## WEST INDIAN PRODUCTS.

### Drugs and Spices in the London Market.

The following report on the London drug and spice market for the month of February has been received from Mr. J. R. Jackson, A.L.S.:—

The market in the above commodities during the month of February began with some general improvement, which was only partially maintained as the month advanced, and at the end had dropped to a point below the normal condition.

#### GINGER.

The quotations have advanced considerably; thus, at the first auction, 40 barrels of Jamaica were offered and bought in at 80s. to 85s. for fair washed and slightly wormy, and 90s. for good bright. A week later prices stood at about the same figures, namely, for the 20 barrels and 13 bags of Jamaica offered, including good bright medium and small, the whole was bought in at 86s. On the 20th., the offerings of Jamaica amounted to 250 barrels, only 13 of which were sold, good bright small, fetching 80s. At the last auction,

only 15 packages of Jamaica were offered, all of which were bought in at 80s. for lean washed, and 75s. for good common. One hundred bags of Japanese were also offered, but no sale was effected.

#### NUTMEGS, MACE, AND PIMENTO.

On the 6th., 70 packages of West Indian nutmegs were offered and 50 were sold at steady rates. A week later, there was a good demand at full rates for the larger sizes. On the 20th., the market was very quiet, the following being the quotations: 134 to the lb., 5d.; 106, 6d.; wormy and mouldy, 118 to 117, 5½d. to 5¼d.

Of mace there is but little to report. On the 13th., a slightly dearer tone prevailed; 25 packages of West Indian were offered and disposed of at 1s. 6d. for palish to pale, 1s. 4d. to 1s. 5d. for fair red, and 1s. 1d. for broken. No change took place during the remainder of the month.

Pimento was steady at the auctions throughout the month, varying but slightly, as will be seen from the following quotations: At the first spice sale, fair fetched 2½d. to 2¾d., and ordinary mixed, 2½d. At these rates 130 bags were sold. On the 13th., some 490 bags were offered and bought in at 2¾d. for fair, and 2½d. for good. On the 27th., 80 bags were sold without reserve at 2½d. per lb.

#### ARROWROOT.

At the first spice auction all the offerings of good manufacturing St. Vincent in barrels were bought in at 2¾d., and 2 kegs of Bermuda, out of 4 offered, were sold at 1s. 2d. per lb. A week later, fair manufacturing St. Vincent was offered to the extent of 770 barrels, and 240 were sold at 2½d. At the last sale 240 barrels of fair manufacturing were offered and bought in at 2¾d. to 2½d.

#### SARSAPARILLA.

This drug continues to be very scarce, and the month has been marked by a considerable advance in price. On the 14th., there was a sharp competition for the 13 bales of grey Jamaica that were offered, as much as 3s. 10d. to 4s. per lb. being paid for fair quality, which was an excess of 10d. to 1s. per lb. over previous prices. Eleven bales of Lima-Jamaica were also offered and sold at 2s. 9d. to 3s. 3d., and 7 bales of native Jamaica, fair to good red, fetched from 1s. 7d. to 1s. 11d. A week later, Lima-Jamaica was held at 3s. 6d. and fair red native at 2s. At the last auction, 8 bales of Lima-Jamaica realized 3s. 3d. to 3s. 5d. per lb. Native Jamaica, pale red, fetched 1s. 9d. to 2s. 3d. per lb.

#### LIME JUICE, OIL OF LIME, ETC.

Of the former, 3 puncheons of common, brown, unworked, West Indian were offered on the 13th. and disposed of without reserve at 6d. per gallon, and at the same auction 15 cases of distilled West Indian oil of lime were sold at from 2s. 9d. to 2s. 10d. per lb.

Of other products interesting to West Indian commerce may be mentioned the arrival of 4 cases of West Indian papaw juice, for which 10s. per lb. was a suggested price. Cashew nuts arrived to the extent of 60 cases at the close of January, a portion of which has since been sold at 42s. 6d. At the end of February, 4 bags of dark West Indian kola arrived, for which 2¾d. per lb. was said to have been offered. Annatto seeds, to the extent of 6 bags only of ordinary dull dry Ceylon, were offered in the middle of the month and sold without reserve at 1¼d. per lb. Of orange peel, fine bright Maltese strip, new crop, realized, in the middle of the month, 1s. to 9d., according to quality, and at the end of the month fair Tripoli strip sold at 9d. to 11d.



## MARKET REPORTS.

**London**,—March 12, 1907. 'THE WEST INDIA COMMITTEE CIRCULAR,' Messrs. KEARTON, PIPER & Co.; Messrs. E. A. DE PASS & Co., March 8, 1907; 'THE LIVERPOOL COTTON ASSOCIATION WEEKLY CIRCULAR,' March 8, 1907.

ARROWROOT—St. Vincent,  $2\frac{1}{4}d.$  to  $2\frac{3}{4}d.$  per lb.  
BALATA—Sheet, 1/8 to 2/-; block, 1/6 to 1/7 per lb.  
BEES'-WAX—£7 10s. to £8 per cwt.  
CACAO—Trinidad, 85/- to 92/- per cwt.; Grenada, 74/- to 79/- per cwt.  
COFFEE—Jamaica, good to fine ordinary, 43/- to 47/-; greenish to fine, 51/- to 126/- per cwt.  
COPRA—East Indian, £27 5s. to £28 5s. per ton.  
COTTON—Good medium fine, 7·10d.; West Indian Sea Island, good medium,  $19\frac{1}{2}d.$ ; medium fine,  $20\frac{1}{2}d.$ ; fine, 22d.; prices paid, 7d. to  $24\frac{1}{2}d.$   
FRUIT—  
GRAPE FRUIT—12/- to 14/- per box.  
BANANAS—Jamaica, 4/- to 6/- per bunch.  
ORANGES—5/- to 7/- per case.  
PINE-APPLES—St. Michael's, 1/9 to 4/- each.  
FUSTIC—£4 5s. to £4 15s. per ton.  
GINGER—Jamaica, common, 65/- to 70/-; medium to fine, 72/- to 90/- per cwt.  
HONEY—20/- to 25/- per cwt.  
ISINGLASS—West Indian lump, 2/5 to 2/6; cake, 1/1 per lb.  
LIME JUICE—Raw, 1/2 to 1/6 per gallon; concentrated, £23 10s. per cask of 108 gallons; Distilled Oil, 2/10 to 2/11 per lb.; hand pressed, 3/3 to 3/6 per lb.  
LOGWOOD—£4 5s. to £4 15s.; roots, £3 5s. to £4 5s. per ton.  
MACE—Pale, 1/6 to 1/7; red, 1/4 to 1/5; broken, 1/1 per lb.  
NUTMEGS—62's, 1s. 5d. to 1s. 7d.; 66's, 1s. 3d.; 70's,  $10\frac{1}{2}d.$ ; 80's, 10d.; 93's, 8d.; 106's,  $6\frac{1}{2}d.$ ; 112's, 6d.; small,  $4\frac{1}{2}d.$  to  $5\frac{1}{2}d.$   
PIMENTO—Fair,  $2\frac{1}{2}d.$  to  $2\frac{3}{4}d.$  per lb.  
RUM—Jamaica, 2/9; Demerara, 1/- per proof gallon.  
SUGAR—Crystals, low to good yellow, 15/6 to 16/6; fine, 17/- to 18/-; Muscovado, 13/6 to 14/6; Molasses, 11/- to 14/- per cwt.

**Montreal**,—January 18, 1907.—Mr. J. RUSSELL MURRAY.  
(In bond quotations, c. & f.)

COCOA-NUTS—Jamaica, \$27·00; Trinidad, \$25·00 per M.  
COFFEE—Jamaica, medium, 10c. to 12c. per lb.  
GINGER—Jamaica, unbleached, 13c. to 14c. per lb.  
MOLASSES—Barbados, 27c. to 28c.; Antigua, 25c. to 26c. per Imperial gallon.  
NUTMEGS—Grenada, 110's, 15c. to 16c. per lb.  
PIMENTO—Jamaica,  $5\frac{1}{4}c.$  to  $5\frac{1}{2}c.$  per lb.  
SUGAR—Grey crystals, 96°, \$1·98 to \$2·05 per 100 lb.  
—Muscovados, 89°, \$1·40 to \$1·50 per 100 lb.  
—Barbados grocery, \$2·10 to \$2·25 per 100 lb.

**New York**,—March 22, 1907.—Messrs. GILLESPIE BROS. & Co.

CACAO—Caracas,  $18\frac{1}{2}c.$  to 19c.; Grenada, 17c. to  $17\frac{1}{4}c.$ ; Trinidad, 18c. to  $18\frac{1}{2}c.$ ; Jamaica, 15c. to 17c.; Dominica, 16c. to  $16\frac{1}{2}c.$  per lb.  
COCOA-NUTS—Jamaica, \$25·00 to \$26·00; Trinidad, \$24·00 to \$25·00 per M.  
COFFEE—Jamaica ordinary, 8c. to  $8\frac{1}{4}c.$ ; good ordinary,  $8\frac{3}{4}c.$  per lb.  
GINGER—Dark scraggy root,  $11\frac{1}{4}c.$  to 12c.; small to bright bold,  $12\frac{1}{2}c.$  to 15c. per lb.  
GOAT SKINS—Jamaica, Antigua, and Barbados, 59c.; St. Kitt's, St. Thomas, and St. Croix, dry flint, 54c. to 56c. per lb.  
GRAPE FRUIT—Jamaica, \$4·00 to \$5·50 per barrel; \$3·00 to \$3·50 per box.  
LIMES—no quotations.  
MACE—28c. to 36c. per lb.

NUTMEGS—95's to 100's,  $17\frac{1}{2}c.$ ; 100's to 110's, 13c.; 130's to 140's, 12c.  
ORANGES—Jamaica, \$4·00 to \$5·00 per barrel; \$2·50 to \$3·00 per box.  
PIMENTO— $5\frac{1}{4}c.$  per lb.  
SUGAR—Centrifugals, 96°, 3·51c. to 3·55c.; Muscovados, 89°, 3·01c. to 3·05c.; Molasses, 89°, 2·76c. to 2·80c. per lb., duty paid.

## INTER-COLONIAL MARKETS.

**Barbados**,—March 26, 1907.—Messrs. T. S. GARRAWAY & Co., and Messrs. JAMES A. LYNCH & Co.

ARROWROOT—St. Vincent, \$4·75 per 100 lb.  
CACAO—Dominica, \$14·50 to \$15·00 per 100 lb.  
COCOA-NUTS—\$14·00 per M. for husked nuts.  
COFFEE—\$10·25 to \$10·50 per 100 lb.  
HAY—\$1·00 to \$1·30 per 100 lb.  
MANURES—Nitrate of soda, \$65·00; Ohlendorff's dissolved guano, \$55·00; Cotton manure, \$42·00; Cacao manure, \$42·00 to \$45·00; Sulphate of ammonia, \$75·00; Sulphate of potash, \$67·00 per ton.  
MOLASSES—16c. to 17c. per gallon.  
ONIONS—Antigua, \$3·00 per 100 lb.  
POTATOS, ENGLISH—\$3·25 to \$3·75 per 160 lb.  
RICE—Demerara, \$5·65 to \$5·75; Ballam, \$5·45 to \$5·90 per bag (190 lb.); Patna, \$3·00 to \$3·75; Rangoon, \$2·70 to \$2·90 per 100 lb.  
SUGAR—Dark crystals, \$2·05 to \$2·20; Muscovado, \$1·60 per 100 lb.  
SYRUP—17c. per gallon.

**British Guiana**,—March 30, 1907.—Messrs. WIETING & RICHTER.

ARROWROOT—St. Vincent, \$11·00 per barrel.  
BALATA—Venezuela block, 32c.; Demerara sheet, 48c. per lb.  
CACAO—Native, 17c. to 18c. per lb.  
CASSAVA—80c. to \$1·00 per barrel.  
CASSAVA STARCH—\$6·00 per barrel.  
COCOA-NUTS—\$10·00 to \$12·00 per M.  
COFFEE—Creole, 14c. to 15c.; Jamaica, 14c. to  $14\frac{1}{2}c.$  per lb.  
DHAI—\$4·50 to \$4·75 per bag of 168 lb.  
EDDOS—\$1·00 to \$1·56 per barrel.  
MOLASSES—16c. per gallon.  
ONIONS—Lisbon, 4c. to  $4\frac{1}{2}c.$  per lb.  
PLANTAINS—20c. to 44c. per bunch.  
POTATOS, ENGLISH—Nova Scotia, \$2·90 to \$3·00 per barrel.  
POTATOS, SWEET—Barbados, \$1·44 per bag.  
RICE—Ballam, \$5·90 to \$6·00 per 177 lb.; Creole, \$4·75 to \$4·80 per bag (ex store).  
SPLIT PEAS—\$5·80 per bag (210 lb.).  
TANNIAS—\$2·64 per bag.  
YAMS—White and Buck, \$2·64 per bag.  
SUGAR—Dark crystals, \$2·00 to \$2·10; Yellow, \$2·60 to \$2·70; White, \$3·60 to \$3·70; Molasses, \$1·40 to \$1·75 per 100 lb. (retail).  
TIMBER—Greenheart, 32c. to 55c. per cubic foot.  
WALLABA SHINGLES—\$3·00, \$3·75, and \$5·25 per M.

**Trinidad**,—March 30, 1907.—Messrs. GORDON, GRANT & Co.

CACAO—Ordinary to good red, \$18·40 to \$18·65; estates, \$18·75 to \$19·00 per fanega (110 lb.); Venezuelan, \$18·60 to \$18·85.  
COCOA-NUTS—\$21·00 per M., f.o.b.  
COCOA-NUT OIL—\$1·10 per Imperial gallon (cask included).  
COFFEE—Venezuelan, 8c. per lb.  
COPRA—\$4·75 per 100 lb.  
DHAI—\$4·50 to \$4·60 per 2-bushel bag.  
MOLASSES—16c. per gallon.  
ONIONS—\$3·00 to \$3·50 per 100 lb. (retail).  
POTATOS, ENGLISH—\$1·60 to \$2·00 per 100 lb.  
RICE—Yellow, \$5·40 to \$5·60; White, \$5·75 to \$6·00 per bag.  
SPLIT PEAS—\$5·40 to \$5·60 per bag.  
SUGAR—Crystals, \$2·00 to \$2·50; grey crystals, \$2·25 c. & f.; molasses, \$2·00 to \$2·25 per 100 lb.





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Distribution of Economic Plants  
by the Botanic Stations in  
the West Indies.

**I**N a paper in the last issue of the *West Indian Bulletin*, Mr. W. R. Buttenshaw reviews the work done by the Botanic Stations in the West Indies in encouraging the more

extensive cultivation of economic plants. In the absence of private nursery establishments, such as exist in northern latitudes, the value of this distributing function of these institutions has been especially realized: for at all of them nurseries are maintained for the purpose of raising plants for sale or gratuitous distribution. Planters and settlers who may not have had facilities for raising their own plants have thereby been enabled to get a start of several months in laying out plantations.

The Botanic Stations have thus been enabled to play an important part in the extension of plantations. For example, over 161,000 cacao plants have been distributed from these institutions during the last five years (exclusive of a large number of pods), principally in Dominica (64,601), St. Vincent (41,392), and St. Lucia (27,940). Of rubber plants, planters obtained over 22,000 during the same period, the Dominica station supplying nearly 17,000.

Perhaps of greater significance are the indications of the extension of the planting of lime trees. The demand for lime plants from the Dominica Botanic Station has become so great that the Curator has been obliged to call upon planters to start their own nurseries. By this station alone over 200,000 plants have been distributed during the last six years, in addition to 12,000 plants of the spineless lime. After allowing a percentage for loss, this number is sufficient to plant, at 15 feet apart, 1,000 acres of land. Similarly at St. Lucia, it is estimated that the 54,600 lime plants distributed during the five years 1902-6 are sufficient to plant, at 12 feet apart, about 150 acres. At the



present time great attention is being devoted to lime planting in St. Lucia, with the result that, as stated in the last issue of the *Agricultural News* (p. 108), the Agricultural Superintendent has already received orders for over 100,000 plants for planting during the coming season, or sufficient to plant some 270 acres.

Planters have also much appreciated the assistance of the Botanic Stations in supplying budded or grafted plants of fruit trees. This has enabled them to obtain the best varieties of citrus plants, mangos, etc. As comparatively few estates have employees who are capable of carrying out this important work, planters have been obliged to rely upon the Botanic Stations for a supply of such plants. With the training of pupils at the Agricultural Schools and at some of the Botanic Stations in the operations of budding and grafting, it should be possible, in the course of time, and as the advantage of budded and grafted plants over seedlings secures its due recognition, for planters to obtain the services of proficient budders and grafters, and so have this work carried out on their estates.

Last year, 692 plants were successfully budded by the pupils of the Agricultural School at Dominica, who raised also thirty plants of grafted mangos. At the St. Lucia Agricultural School, 550 budded orange plants were raised last year by pupils. It is shown that budded citrus plants occupy an important position in the lists of plants distributed from some of the Botanic Stations, while there is also a steady demand for grafted mango plants.

The Botanic Stations also serve a useful purpose as agents in distributing plants received from other stations in the West Indies or from abroad. In regard to the latter, mention should be made of the very valuable collections of economic plants received from the Royal Botanic Gardens at Kew; also from some of the botanical establishments in the East.

This branch of the work is especially noticeable in connexion with the growth of new varieties of sugar-canes. In the islands where experiments are being conducted to find varieties of sugar-cane which are disease resistant, or which give a higher yield of sugar, tops of selected canes are always available for distribution among planters. Some of these are recommended only for cautious trial, others for more extensive planting. The Botanic Stations in islands where such experiments are not being conducted have been in a position to import tops of all the newer seedlings for local distribution. From Barbados there were sent away during the five years 1902-6, 1½ tons of

tops of seedling cane B. 208 (or, approximately, 56,000 tops), and 73,545 cuttings of other canes. The St. Lucia station imported, during 1904-5, 19,700 seedling cane plants. A total of 170,000 cuttings was distributed from the Botanic Station to estates in St. Kitt's during the last eight years. In Antigua it has been the custom to sell the variety canes by auction at a public meeting of planters. In 1906, 1,693 tops were distributed from Skerrett's.

Teachers in charge of elementary schools have received assistance from the nurseries in establishing school gardens. Not only has advice been freely given by the local officers in the choice of suitable locations and kindred matters, but vegetable seeds and plants have in many cases been presented. Thus, last year, 385 plants, in addition to large quantities of seeds, were distributed free to school gardens in St. Lucia, and vegetable seeds were regularly supplied for the same purpose in St. Vincent.

Further, in connexion with the Arbor Day movement, plants have been raised in the nurseries of the Botanic Stations for official and private planting. The Tobago station distributed 216 plants to managers of schools and others for planting on Arbor Day in 1905. In 1906, 791 plants were obtained for this purpose from the Botanic Station at Barbados. Similarly, plants are annually raised for this function at Antigua and St. Kitt's.

Then, again, in the case of cotton, much of the striking success achieved in connexion with this industry has been due to the fact that, when the industry was first started on commercial lines, the Imperial Department of Agriculture imported sufficient selected seed from the Sea Islands to plant 7,000 acres. Since then, practically 80 per cent. of all the selected seed sown during the last three years has been supplied by the Department through the Botanic Stations, the officers in charge of which have been in a large measure responsible for the successful results obtained. Similar assistance was rendered in the case of the onion industry, the Department importing the seed each year from Tenerife.

Sufficient has been said to indicate that 'one is undoubtedly forced to the conclusion that, if for no other reasons, the Botanic Stations under the direction of the Imperial Department of Agriculture for the West Indies have justified their existence by reason of the great assistance of this nursery work to the members of the planting community.'



## SUGAR INDUSTRY.

### Seedling Sugar-canes in Mauritius.

It is stated in Bulletin No. 15 (1907) of the Station Agronomique of Mauritius that the cultivation of seedling canes is extending in that island every year, but none of them has at yet replaced the common cane, Big Tana.

This cane, on the average, seems to give a better result than any seedling cane yet tried. The yield of Big Tana is especially heavy from the plant canes; its ratoons do not always do so well. Mr. Boname, the Director of the Station, considers, however, that Big Tana will, like all other canes which have been grown in Mauritius, gradually decrease in its yield until it will no longer be advantageous to cultivate it. Then it can be replaced by seedling canes, and those estates which have cultivated several different kinds of seedling canes for several years on a small scale will be able to select and multiply those which are most suited to their special conditions.

The seedling canes grown at Pamplémousses are selected during their first year for growth and appearance, and the second year for their size and richness in sugar. It has been noticed that the most vigorous seedling canes in Mauritius are poor in sugar. Other seedling canes are more or less attacked by the gum disease, although often nothing abnormal is noticed in their appearance until they come to be cut. Each variety of seedling cane is grown in from eighteen to thirty holes. It is evident that, in order to obtain trustworthy results, canes grown on such a small scale must be repeatedly analysed during several years and grown on many different plots.

### Introduction of the Sugar-cane into the West Indies.

In the *Agricultural News* (Vol. VI, p. 35) reference was made to the history of the sugar-cane in the West Indies, and it was pointed out that the native home of the sugar-cane should probably be looked for in the East and the Pacific Islands, and that there is every probability that the sugar-cane is an introduced plant, brought to the West Indies in or about 1520 by Columbus.

Washington Irving, in his *Life and Voyages of Christopher Columbus* (London: George Bell & Sons, 1890), makes no mention of the sugar-cane being found upon the islands discovered during the first voyage, but it is on record that in fitting out for his second voyage in 1493, Columbus made arrangements in Spain so that 'Grain, seeds of various plants, vines, *sugar-canes*, grafts and saplings were embarked, together with a great quantity of merchandise. . . . calculated for trafficking with the natives.'

In about the middle of December 1493, the founding of the city of Isabella (in Hispaniola) with the planting of orchards and gardens, led to the emptying of most of the ships, for it is stated that 'the ships having discharged their cargoes, it was necessary to send the greater part of them back to Spain.' Twelve of the ships were sent home early in 1494, and by these ships Columbus sent despatches to Spain describing 'the quick fecundity of the soil, evinced in the luxuriant growth of the *sugar-cane*, and of various grains and vegetables brought from Europe;' and on March 29, 1494, he found on return to Isabella from an expedition into the interior that 'the plants and fruits of the Old World which

he was endeavouring to introduce into the island, gave promise of rapid increase,' and that 'the *sugar-cane* had prospered exceedingly.'

From the above and other information of a corroborative character, it would appear: (1) that the sugar-cane was not indigenous to the West Indies; (2) that it was introduced into the West Indies by Columbus on his second voyage. It is probable, therefore, that the date 1493 should be accepted as the date of its introduction by Columbus—not 1520 as previously mentioned. There was an introduction in 1520, but it was not by Columbus.

Other introductions of the sugar-cane into the New World are recorded by De Candolle in the 'Origin of Cultivated Plants' as follows:—

The propagation of the sugar-cane from India westward is well known. The Arabs in the Middle Ages introduced it into Egypt, Sicily, and the South of Spain, where it flourished until the abundance of sugar caused it to be abandoned. Don Henriquez transported the sugar-cane from Sicily to Madeira, whence it was taken to the Canaries in 1503. Thence it was introduced into Brazil in the beginning of the sixteenth century. It was taken to San Domingo about 1520, and shortly afterwards to Mexico, to Guadeloupe in 1544, to Martinique about 1650.

### DOMINICA PLANTERS' ASSOCIATION.

A general meeting of the Dominica Planters' Association was held in Roseau on March 30, the Vice-Chairman (Mr. E. A. Agar) presiding.

The correspondence between the Imperial Commissioner of Agriculture for the West Indies, his Honour the Administrator, and the association concerning the recent conference with the delegates from the Canadian Boards of Trade was read.

The association was represented at the conference by the Vice-Chairman and a small committee appointed for that purpose, and a report of the proceedings, which had been prepared, was read and approved.

Correspondence with respect to the conference in Barbados on the subject of the establishment of a regular mail service between England and the West Indies and a resolution forwarded to Barbados by the standing committee were also read and approved.

Some interesting remarks in connexion with the recent Agricultural Conference in Jamaica were made by the gentlemen who had attended the Conference as delegates of the association, special tribute being paid to the Jamaica Agricultural Society, Sir Daniel Morris, and Sir Alfred Jones.

Various matters of local interest to planters were discussed, after which the meeting rose.

**Two West Indian Timbers.** In the *Kew Bulletin*, No. 2, 1907, it is noted that among the timbers imported into Liverpool there is a wood called 'washiba' from British Guiana. This is a tough, elastic wood, of a reddish-brown colour, and is in demand in England for wheel-spokes. The botanical source of this wood has been stated doubtfully as *Parinari guianensis* (?). At Kew this wood was found to be indistinguishable from specimens of 'poui' wood from Trinidad, which are probably from a species of *Tecoma*. 'If the tree known in Trinidad as "green poui" should prove to be plentiful, it might be worth while to ascertain whether its wood can be used as a substitute for that of the scarce "washiba" of British Guiana.'





## WEST INDIAN FRUIT.

### THE SAPODILLA.

The sapodilla (*Achras Sapota*), which is called naseberry in Jamaica, belongs to the order *Sapotaceae*, and is a native of tropical America. Its name is probably derived from the Spanish *sapotilla*, meaning the little sapote, to distinguish it from the sapote or grosse sapote (*Lucuma mammosa*), which was described in the *Agricultural News* (Vol. VI, p. 53).

The tree is 20 to 30 feet high, with leathery, shining, dark-green lanceolate-oblong leaves, and small flowers, single in the leaf-axils of the young branches. The young branches, leaf-stalks, flower-stalks and calyx are brown. The six-lobed, whitish corolla bears six stamens alternating with six leaf-like staminodes. The fruit is globose or ovoid, about 3 inches across, rough and brown on the outside, with a firm, very sweet brownish or colourless pulp, enclosing polished black seeds, of which there may be up to ten.

The sapodilla seems to stand shipment well, and appears to have been appreciated whenever it has been shipped to temperate regions. The milky juice of the tree is evaporated in Mexico to form chicle gum, which is exported to the United States to be used in the manufacture of chewing gum.

The sapodilla fruit varies considerably in size, colour, and flavour, but as it is readily propagated by budding a uniform plantation can be established.

fruit of a marketable quality, and if that can be accomplished, not only will the growers benefit, but the better quality of fruit obtainable will offset to this company the loss from the Government payment which it is proposed to resign.

It will not have escaped the notice of the Government of Trinidad that the neighbouring Dutch colony of Surinam is desirous of promoting banana cultivation and that the course determined on is as follows:—

(1) To subsidize the growers in order to promote an adequate production of cultivated bananas.

(2) To guarantee to the purchaser a minimum quantity of suitable fruit at fixed prices for a term of years, thereby enabling the purchaser to rely on sufficient fruit to fill the insulated spaces he provides.

We believe the principle of subsidizing the growers to be worthy of consideration by the Government of Trinidad, and while this company is quite prepared to dispense with any Government payment, it is thought the Government of Trinidad might well undertake responsibility for the supply of sufficient good marketable fruit, to fill the spaces provided, at the same prices as such fruit is to be furnished to buyers in Surinam. Indeed an adequate supply of suitable fruit at prices competing with the prices ruling in other sources of supply is essential to put the business on a permanently sound basis.

### TRINIDAD BANANA INDUSTRY.

The following is extracted from a letter, dated March 11, addressed to the Crown Agents by the British West Indian Fruit Company, Ltd., giving notice of its intention to terminate the contract entered into by the company with the Government of Trinidad for the purchase of bananas. The company states that it does not propose to cease purchasing bananas in Trinidad:—

The chief difficulty hitherto encountered by this company has been to secure in Trinidad bananas of good quality in sufficient quantities to freight the insulated spaces put at our disposal by the Royal Mail Steam Packet Company, and we have been compelled to buy, under the terms of the contract, fruit, which, by reason of its deficiency in size or quality, is entirely unsuited to the home market.

My directors therefore feel that the financial support accorded to this company by the Trinidad Government would be much better applied in assisting the growers to produce

### COCOA-NUT FIBRE.

Coir fibre is produced from the husk of the cocoa-nut. The nuts are cut before they are ripe, when about ten months old, in order to produce the best coir. At this stage the husk makes up half the weight of the whole nut. If cut earlier the fibre is weak, and later it becomes coarse and hard, and is more difficult to manufacture. The husks are first crushed between fluted rollers and then passed over a cylinder covered with steel teeth which tear the fibres from the husk. The large quantity of husks resulting from the manufacture of copra or oil may be used as fuel, or made into an inferior coir or packing fibre or made by alkalis into a pulp resembling wood pulp for roofing and felting. There is no established commerce in coir in the Philippines, practically all the husks being used for fuel or thrown away. It is estimated that, approximately, 400,000 tons of husks are produced in the islands annually, and they are worth considering from the standpoint of their applicability for paper or pulp manufacture. (*Philippine Journal of Science*, December 1906.)



### CYPHERS INCUBATOR.

The following description of the Cyphers incubator is extracted from Mr. Edward Brown's *Poultry Keeping as an Industry for Farmers and Cottagers* (see *Agricultural News*, Vol. VI, p. 93):—

This machine is of American make, but has been largely sold in Europe. Not having a tank considerably reduces the cost of production, but it differs distinctly in other respects from the machines which are almost universal here, apart from the question of hot air. In the first place, the method of ventilation is altogether changed; there is no bottom supply of air, nor are there any holes for either inlet or escape in the egg-chamber of the machine. In appearance we have the same compact body with a lamp at one side. Fresh air is drawn upwards by the side of the lamp and heated, passing into an upper chamber above the egg-drawer without being affected by the fumes of the lamp. The air-chamber has at the bottom a framework upon which is stretched felting, through which the heat has to find its way downwards. It will be realized that in this passage, which must be comparatively slow, there are no streams of hot air and the heat is distributed by diffusion, which secures regularity and uniformity of temperature. The heat now passes down through the egg-chamber and into a lower chamber, from which it is drawn outwards by the heat of the lamp. It is claimed that in this way there is an even distribution with regular circulation, and that, therefore, an even temperature is maintained. Another striking



FIG. 10. CYPHERS INCUBATOR.

peculiarity of this machine is that moisture is not supplied, and it is claimed that there is always enough moisture in the atmosphere to supply the needs of the chickens. That is a point upon which many different opinions are held, and it is only by testing and practical experience that it can be proved; but, of course, the absence of a moisture-tray does away with the necessity of an influx of cold air, and, therefore, all the air passing into the machine is warmed. . . . The regulator consists of a double-action thermostat. It is many years since the thermostat was first tried in this country, and given up because it was less delicate than the capsule invented and introduced by Mr. Hearson. The makers of the 'Cyphers,' however, have now greatly improved the thermostat, and the power is more than sufficient to maintain regularity of temperature. The fumes from the lamp escape by a chimney, over which a cap is placed similar to that met with in various English machines, and is regulated by that cap. There are several other points in this incubator which are interesting. In the first place, there is no drying-box; the trays do not quite fill the egg-chamber, and the chickens coming forward to the light—as there are windows inserted in front—drop down below the egg-tray and

remain underneath. This is an interesting change which could scarcely be adopted with safety if the inlet of air were from below; but, as the hot air descends upon the eggs, the air is not contaminated by the chickens. Trays are provided, divided into different compartments, so that the eggs from different breeds may be kept in the same incubator and distinct, for registration and rearing purposes.

This incubator has been in successful use at the Agricultural Schools in Dominica, St. Vincent, and St. Lucia. Notes on experiments with it will be found in the *Agricultural News*, Vol. V, pp. 154 and 245.

### PREPARATION OF ESSENTIAL OILS.

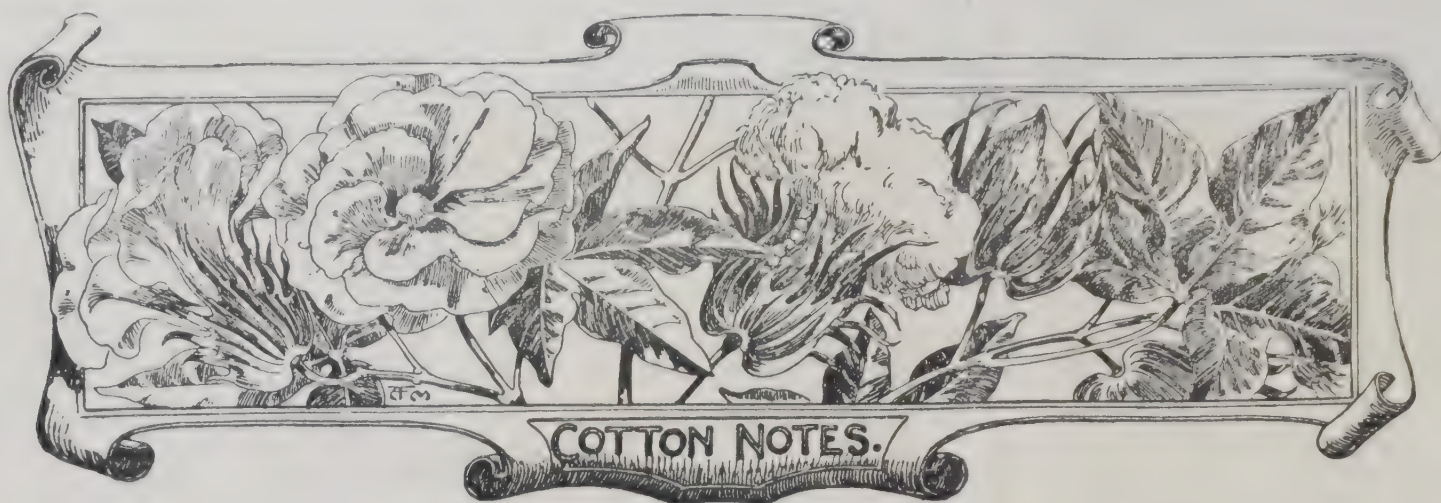
In view of the attempts that are being made to establish an industry in the production of essential oils, e.g., bay oil and lemon grass oil, in the West Indies, the following notes on the preparation of such oils may be of interest:—

Some essential oils, such as those from the rinds of citrus fruits, e.g., lime, sweet and bitter orange, tangerine, and grape fruits, are injured by distillation and fetch higher prices if extracted by pressure or otherwise, without the application of heat. The essential oils of certain scented flowers also, which cannot bear distillation, are obtained, as pomades, by covering boxes of the flowers with sheets of glass coated on the lower side with a thin layer of pure fat, to absorb the volatile oil which is the cause of the perfume. But most essential oils are prepared from the leaves, flowers, or other parts of plants by distillation along with water. The practical use of the water is to lower the boiling (or evaporating) point; for a mixture of any volatile oil with water boils at a lower temperature than either the oil or the water if separate. By this method the vapour of the oil must be accompanied by a certain amount of steam, and the distillate is composed of the oil with a certain quantity of condensed water. The higher the boiling point of the oil in question, and the lower the density of its vapour, the more water must necessarily be distilled along with it. Thus, the easily distilled caraway oil required twice its weight of steam at the beginning and twelve times its weight towards the end of a distillation. This was because caraway oil consists of a mixture of two simple oils of very different boiling points. Much the same happens with ylang-ylang oil.

It is not the practice in distillation of essential oils to apply the fire to the bottom of the still containing water and the finely divided oil-bearing substance. It is much better to lead steam from a separate boiler into the mixture until the oil has distilled. In some cases, where there is a large volume of the substance, as in the case of the oil-grasses, steam may be led to the bottom of a vessel packed with the grass and passed for some hours until all the oil has evaporated. The spiral worm is by no means a very efficient condenser and its place is taken in modern apparatus by thin, jacketed tubes, the stream of cold water running along all round the tube in the opposite direction to the vapours inside.

A number of essential oils might be worthy of experimental distillation in the West Indies, e.g., lemon grass, citronella, and other grass oils, ginger oil from waste ginger, cananga oil, nutmeg oil from waste nutmegs or mace, avocado oil from the leaves of the avocado, Neroli oil from bitter orange flowers, etc. The production of bay oil is already well established in the West Indies. Schimmel & Co. note that bay oil when distilled separates into two parts which sink and float, respectively. They add that these two fractions should not be kept separate, as is sometimes done, but mixed to make a normal oil.





### WEST INDIAN COTTON.

Messrs. Wolstenholme & Holland, of Liverpool, have forwarded the following report, dated March 25, on the West Indian Sea Island cotton market:—

Since our last report a good business has been done in West Indian Sea Island, and prices remain very firm.

The bulk of the sales has been composed of cotton from 22½*d.* to 25*d.* from all the islands, a few bags of fancy Antigua commanding rather higher figures, viz., 26*d.* to 28*d.*

To realize above 24*d.* per lb., cotton must be very exceptional in quality.

### COTTON CROP IN THE SEA ISLANDS.

Messrs. Henry W. Frost & Co's. Sea Island Report, of March 23, has the following in regard to the planting of the next crop:—

With a very early, warm, and dry spring, the land in all three states has been well prepared for planting, but owing to a long dry spell of weather, planters in Florida, and partly so in Georgia, are only awaiting a good rain before generally planting. In this state planting will be general about the usual season, viz., the end of the month.

As to the acreage, it is estimated there will be no material change in South Carolina. In Georgia and Florida, without any official information and having to rely on the reports of farmers and merchants which are partly intended to be misleading, it is impossible to give any reliable estimate. In Georgia it is generally reported there will be considerable increase; and in Florida some increase, but what percentage over the last it is impossible to give. It is generally thought, however, that there will be a sufficiently large increase with a favourable season to produce a good-sized crop, say, approximating the crops of 1904 and 1905.

### SELECTION OF COTTON SEED.

For some time it has been recognized that the clean, black cotton seeds with a sharp, naked spine, are inferior to the tufted seeds as regards the quality of the cotton lint which is obtained from them, and in the hand selection of the seed, the clean, black type has been discarded as not the best for planting purposes.

In an experiment carried on at Antigua by Dr. Watts, several plots were planted with various kinds of seeds, and he found that when clean, black, or naked seeds were sown, 33·8 per cent. of the same type of seed were reproduced; whereas, when seeds with a slight amount of fuzz upon them

were sown, only 4 per cent. of naked seeds were reproduced. (See *Agricultural News*, Vol. IV, p. 106.)

Information has been received of unselected seed being planted on a certain estate last season, and in the crop which has just been reaped a very high percentage of clean, black seeds has been found. The two types, viz., those with clean, black, or naked seeds and those with tufted seeds, taken from one field, have been examined at the Head Office, with the result that the former gave only 23 per cent. lint to seed, while the latter gave 26 per cent.

The lint from the clean seeds is also inferior, being weaker and more 'wasty' than that obtained from the tufted seeds.

During the coming season, it would be well to continue the same method of general seed selection, viz., discarding the naked, black seeds with the spine, which produce a cotton of an inferior quality, and keeping only the seeds with the fuzz at both ends. The latter, if otherwise plump and fully developed, are likely to produce a larger percentage of lint to seed, as well as a higher quality of lint.

### PROSPECTS FOR COTTON PLANTING IN MONTSERRAT.

The following is a précis of information prepared by the Local Instructor in Montserrat in reply to a number of questions asked by a correspondent in regard to the prospects of cotton planting in that island:—

There seems to be a bright outlook for cotton growing in the island of Montserrat. At the medium price of 1*s.* 3*d.* per lb. for lint, cotton growing will be remunerative if the crops are of average quantity. Labour in Montserrat is fairly cheap, but not abundant, since many of the labourers are beginning to plant cotton on their own account, and so ceasing to work for the estates. There are good roads. The climate is even enough to be suitable for cotton growing, and the average annual rainfall is 60 inches. Over most of the island the water supply is good; but in some parts the inhabitants have to depend on ponds. There are many springs of water.

Living is very cheap in the island. Provisions, etc., produced locally, are both plentiful and cheap, but imported articles are dear. A single man can rent a house, keep a pony, and live on £150 a year. There are a few estates in the island which are suitable for cotton, and which could be purchased or leased. Some of them are under cultivation and some not. Their land has become poor and would require manuring and green dressing before cotton is grown. They vary in size from 200 to 600 acres, and the price from £500 to £1,000. Their buildings are out of repair, and some of them



have none. There is no stock with them. The annual taxes on land are 1s. per acre for cultivated and 6d. for uncultivated. The taxes in town are 5 per cent. of the assessed rental value. There are very few houses for rent, but £18 a year would rent a small but good house, five minutes from town.

The cotton industry is very flourishing just now, crops having been excellent and prices good. Many estates lost much cotton four years ago from black boll, but this has not been a cause of serious loss since. The cotton leaf blister-mite is widely spread; but if it is controlled until the cotton is ripe, there will not be much damage. To control this pest, all old cotton has to be burnt a month before the new crop is planted in May. The chief difficulty is the labour question, since the peasants are small proprietors, and so fairly independent.

### FISH-CURING FACTORY AT BARBADOS.

A fish-curing factory was established at Barbados in January 1903 under the auspices of the Imperial Department of Agriculture. The history of this venture from the start has been related in the *Agricultural News* (Vol. III, pp. 43, 49, and 104, and Vol. V, p. 105). It having been recently decided to discontinue operations at the factory, the following extract from a letter addressed by the Imperial Commissioner of Agriculture to the Colonial Secretary at Barbados is published for general information:—

I regret to state that on the whole venture, owing to the circumstances above stated, in spite of the favourable results at first obtained, Mr. Hunt has not been able to recoup the expenses incurred by him.

It is evident from the reports furnished from time to time by Mr. Hunt that the catches of flying fish for the last two seasons have been unusually small. Whether this is due to a permanent or temporary falling off in the number of flying fish actually existing in the surrounding waters, I am unable to state. The emigration of fishermen to Colon has now accentuated the situation, with the result that I am compelled to arrive at the conclusion, for the present at all events, that it is not desirable for the Department to continue efforts to carry on a fish-curing industry in this island. I propose to terminate the arrangement with Mr. Hunt on June 30 next, and I shall then be prepared to return the buildings to the Government.

I trust the Governor-in-Executive Committee will realize that this Department has made careful and exhaustive experiments with the view of testing the practicability of establishing a fish-curing industry in this island. That the results have not been so successful as could have been wished is due to circumstances entirely beyond the control of the Department and of the Manager. The falling away in the catches can only be accounted for either by changes in the currents, the diminution in the quantity of fish available, or by their migration, to obtain food, to other portions of the Caribbean Sea. The quantity of other fish caught in these seas would not be sufficient to support a fish-curing industry, so that success in this direction in future must depend solely on the catches of flying fish.

I would add that, to maintain a fish-curing factory in full working and enable it to be a financial success, there should be a regular supply of fish offered during the season, say, from November to June, at rates not much above 15c. per 100. The demand for pickled and cured fish in this island, as well as in Trinidad and British Guiana, would appear to be sufficient to maintain a factory, provided, as already stated, the catches were large and regular.

### PHOSPHATIC MANURES.

The following notes are abstracted from the Cantor Lectures, delivered before the Society of Arts, by Mr. A. D. Hall, M.A., the Director of the Rothamsted Experimental Station:—

The fertilizing properties of bones have been known from time immemorial. In 1905, Great Britain imported 47,346 tons of bones, and the home production was rather greater. Bone meal, which consists of raw ground-up bones with the fat extracted, has been, and is still, over-rated as a source of nitrogen or phosphate. Steamed bone-flour, from which the gelatin has been removed, is more valuable, at the present prices, than bone-meal, since its phosphate is much more available.

Some of the phosphatic guanos (guanos from which the nitrogen has been washed out by rain) are soft and finely divided; these can be applied to the land without treatment with acid.

Deposits of phosphate of lime are found in many countries. Before being employed as manure, they are ground to a fine powder. But since Lawes' patent in 1842, these rock phosphates have usually been rendered soluble by treatment with sulphuric acid. When the superphosphate thus produced is put into the soil, the soluble phosphate it contains is rapidly precipitated, chiefly in the insoluble form (if carbonate of lime is present) of the diphosphate. The clay of the soil also provides, to some extent, the necessary base. As this precipitation takes place all through the soil, the phosphate is very finely divided and thoroughly disseminated; hence the great effectiveness of superphosphate. If, however, the soil is not well supplied with carbonate of lime, the less soluble phosphates of iron and alumina are formed in greater quantity. The conclusion may fairly be drawn that phosphates of all kinds may well be applied to the land much earlier than is usually the case. There is not the least fear of their being washed out, and it is all-important to get them well disseminated through the soil by solution and reprecipitation and by cultivation. For seed crops there may be some advantage in adding the superphosphate with the seed, on account of its stimulating effect on the growth of young roots.

Basic superphosphate is a new manure, manufactured by neutralizing superphosphate with enough lime to leave a slight excess. It is recommended for soils lacking in carbonate of lime. It has not yet been put to a systematic test against other phosphates.

In basic slag there is a tetrphosphate, which is readily split up by carbon dioxide into the diphosphate and carbonate of lime. There is also an excess of free lime, which has often important manurial effects. At the present time about 300,000 tons of basic slag are manufactured annually in Great Britain, of which 120,000 are exported.

The notable success of basic slag seems to be due, in great part, to the lime, which renders available some of the reserves of potash and nitrogen in the soil. Hence its action is most marked on clay soils, lacking in phosphate and lime, and containing much humus. If applied many times, however, and the crop is removed, the land may become impoverished from the loss of its potash and nitrogen. In this case some potash manure will be needed along with the basic slag, while a supply of nitrogen may be provided by growing leguminous plants or by direct application of nitrogenous manure. Hence the amount of free lime in a sample of basic slag is an important matter, but little attention has been, as yet, paid to this point in ordinary analyses for commercial purposes.



## EDITORIAL NOTICES.

Letters and matter for publication, as well as all specimens for naming, should be addressed to the Commissioner, Imperial Department of Agriculture, Barbados.

All applications for copies of the 'Agricultural News' should be addressed to the Agents, and not to the Department.

*Local Agents:* Messrs. Bowen & Sons, Bridgetown, Barbados. *London Agents:* Messrs. Dulau & Co., 37, Soho Square, W., and The West India Committee, 15, Seething Lane, E.C. A complete list of Agents will be found on page 3 of the cover.

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## Agricultural News

VOL. VI. SATURDAY, APRIL 20, 1907. No. 130.

### NOTES AND COMMENTS.

#### Contents of Present Issue.

The editorial in this issue of the *Agricultural News* gives an outline of the work done during the last five years by the Botanic Stations in the West Indies in assisting the development of plantations by distributing economic plants.

A note on the introduction of the sugar-cane into the West Indies appears on p. 115; also a note on the raising of seedling canes in Mauritius.

An illustrated description of the Cyphers incubator is published on p. 117.

The attention of cotton growers is invited to the note on selection of cotton seed (p. 118).

It has been decided to cease operations at the Fish-curing Factory, which was established at Barbados four years ago (p. 119).

An illustration will be found on p. 123, showing the calabash or gourd pipe, previously referred to in these columns.

His Honour the Administrator of Dominica spoke of the work of the Imperial Department of Agriculture and the general agricultural progress of the island in his recent address to the Legislative Council (p. 125).

A number of pedigree animals, the property of the Imperial Department of Agriculture, are offered for sale (p. 127).

#### Improvement of Stock in Antigua.

As supplementing the report on the Agricultural Show at Antigua on February 28, published in the *Agricultural News*, Vol. VI, p. 91, Mr. H. Goodwin, M.R.C.V.S., has forwarded a report on the live stock section.

He remarks that appreciation of the efforts of the Imperial Department of Agriculture was shown by the number of fine young mules exhibited. Antigua is capable of producing animals in every way equal to those imported. The appearance of many of the horses was pleasing and attractive. Among the cattle were some good half-bred Mysore cows and a half-bred Mysore bull.

#### Rice Experiments in British Guiana.

The Board of Agriculture in British Guiana has published a return of crops yielded by twenty-two varieties of rice imported from Ceylon.

One variety gave, without manure, 5,100 lb. of paddy and 11,500 lb. of straw per acre; the second, 4,900 lb. of paddy and 14,300 lb. of straw; while four others gave just over 4,000 lb. of paddy each.

Several of the varieties produced black or dark-brown grains, which are regarded locally with disfavour. 'Samples were submitted to Messrs. Wieting & Richter, by whom they were milled, and who report unfavourably of them as being soft-grained rices, and as such spoiling quickly in this climate. . . None of these rices can be regarded as advisable substitutes for the local variety.'

The ordinary Creole rice of British Guiana yielded 5,100 lb. of paddy and 25,000 lb. of straw per acre, without manure.

#### Frequency of Earthquakes.

An article in the *Geographical Journal*, for March 1907, points out that a number of great earthquakes occur every year, which are recorded by seismological instruments, but only attain notoriety when they occur in some thickly populated part of the land. By far the greater number have their origin under the sea or in sparsely populated lands. Thus, in September 1899, a most violent earthquake occurred at Yakutat Bay, Alaska. The shocks were accompanied by a great sea-wave and the coast of the bay rose several feet, in one place 47 feet. The occurrence of this earthquake has been testified to by the natives, by three prospectors, and by the inhabitants of the village of Yakutat, and the effects are visible on the coast. At Glacier Bay, 135 miles away, it was felt as an earthquake of great violence and shattered the front of the Muir glacier.

Professor Milne noted through his instruments an average of sixty-six great earthquakes a year from 1899 to 1905. Hence, 'no conclusion can be drawn from the fact that a small proportion of the great earthquakes have lately happened to find a large town within the area of their destructive powers. So far as facts go, there is no reason for supposing that any particular town or city is either more or less liable to destruction by earthquakes than it has been in the past.'



### Visit of the Delegation from the British Cotton-growing Association.

The British Cotton-growing Association has issued in pamphlet form an account of the visit of some of its prominent members to the West Indies in January last.

The pamphlet consists of reprints of articles that appeared in the *Agricultural News*, reports of the meetings held at Barbados on January 8 and 18, and a summary of the proceedings in connexion with the West Indian Agricultural Conference at Jamaica.

There are also reprinted letters from the Imperial Commissioner of Agriculture relative to the visit and to the position of the Sea Island cotton industry in the West Indies, with statistics showing the growth of the industry.

### Liverpool Colonial Products Exhibition.

The *West India Committee Circular*, of March 26, reports the opening, by the Earl of Elgin, on March 13, of the fourth of the series of annual exhibitions of colonial products in Liverpool. Lord Elgin mentioned that the object of the exhibition was to let the people of England understand how much they could procure from their own colonies, and to allow the various colonies themselves, by comparing their products with those of their neighbours, to see where they could introduce improvements, and thereby give solidarity to their own position. He referred to the fact that Permanent Exhibition Committees had been formed in most of the West Indian Colonies.

The West Indies were represented by Antigua and Grenada, whose exhibits, arranged and prepared by the Permanent Exhibition Committees, were set out by the West India Committee, while a British Guiana stall was in the capable hands of Mr. J. E. Tinne, the Chairman of the West India Association of Liverpool. There was also a small exhibit from Barbados, including several admirable specimens of cotton put up in such a manner as to enable the length of the staple to be seen at a glance.

Antigua showed magnificent specimens of Sea Island cotton, which were most favourably commented upon, and attracted much attention. Rice occupied a prominent position on the British Guiana stand. Rubber, molascuit, and sugar of every grade also contributed to the representative character of this exhibit.

### Rubber in Panama.

According to a report by the British Consul at Panama, *Castilloa elastica* is indigenous to the republic and grows wild along both coasts from sea-level to altitudes of 2,000 feet.

Mr. Mallet states that, owing to the ruthless cutting down of wild trees to obtain the latex, the production of raw rubber from this source is likely to decrease in the near future. In the Chucunaque district it is claimed that forests of *Castilloa elastica* are as common as forests of other trees, but all attempts to penetrate the territory have failed in consequence of the hostility

of the Indians. In 1906, 214,750 lb. of wild rubber were exported from the republic.

It is estimated that there are 600,000 *Castilloa* trees under cultivation in Panama, some of them already six years old. Each of these is expected to yield, when eight years old, 2½ lb. of pure rubber a year.

### Rubber in Mexico.

The British Consul in Mexico reports that nearly all, if not all, the rubber produced in Mexico is from wild plants, chiefly *Castilloa elastica*. None of the attempts to cultivate rubber trees have yet proved commercially successful.

The Guayule rubber plant (see *Agricultural News*, Vol. V, p. 413), 'which used to grow on otherwise worthless land, is now being extensively cultivated in the northern states of the republic, so that, when the estates now being cultivated with the *Castilloa elastica* yield rubber in commercial quantities, it can be reasonably supposed that there will be a continuous and slowly increasing yield of rubber from Mexico.'

During the fiscal year 1904-5, 1,096,498 lb. of rubber, of the value of \$718,824, were exported from Mexico. No distinction is made in the export statistics between wild and cultivated rubber.

### Minor Industries in Hawaii.

In the *Hawaiian Forester and Agriculturist*, for February 1907, Mr. Jared G. Smith, Agent in charge of the Agricultural Experimental Station, mentions that in 1901, when the station was established, there was only one industry in Hawaii, the sugar industry. There are now five pine-apple canneries in operation, and more are in process of construction. The sisal industry has become prominent within the last three years, and Hawaiian fibre has been found superior to the best fibre of Yucatan. Tobacco of fine quality has been grown experimentally, and rubber-producing trees have been planted in all the larger islands; these two products being regarded as suitable for cultivation by small proprietors.

Insect pests have been controlled by the introduction of their natural parasites, by insecticides, and by strict quarantine. A campaign against mosquitos has been carried on for four years. A number of lines of plant breeding have been entered on, especially in the creation of new varieties of sugar-cane and rice.

Forest reserves have been established, and are being planted up with useful trees. The production of honey has been more than quadrupled during the last five years. The fresh fruit trade of Hawaii with the mainland of the United States has increased in value to more than \$100,000 per annum, and is increasing.

An agricultural college is needed in which Hawaiians could be trained, 'an institution which shall teach young men and women, not only how to become scientific investigators, but to be able to support themselves and add to the wealth of Hawaii by direct application of their knowledge to the soil.'





## INSECT NOTES.

### Yellow Fever and Mosquitos.

At the present time the occurrence of a few cases of yellow fever in certain of the West India Islands is causing a discussion of the nature of the disease and of the means to be adopted for its control.

The attention of readers of the *Agricultural News* is directed to two articles which appeared in these columns last year (Vol. V, pp. 187 and 203), containing information issued by the Colonial Office, in which it is stated definitely that 'it has been proved that yellow fever can only be transmitted by the bite of a particular mosquito known as the "Tiger" or "Brindled Mosquito" (*Stegomyia fasciata*), which must have previously bitten a person suffering from yellow fever; in no other way can it become infected.'

These articles give also an account of the habits of the mosquito, its breeding places, and directions for freeing houses and premises from this insect. The following paragraph is taken from a small book entitled *Mosquito Brigades*, by Dr. Ronald Ross, published in 1901:—

'Regarding yellow fever, Finley, of Havana, has long held the hypothesis that the disease is conveyed by mosquitos. The fact has been recently quite conclusively proved by Lazear, Carroll, Reed, and Agramonte, by direct inoculation of the disease in a number of persons, by means of mosquitos fed twelve or more days previously on patients with the disease. Lazear, who was bitten in this manner, died. Attempts to infect numerous persons by means of the clothing of patients, and by other methods, all failed.'

The Annual Report of the Smithsonian Institution for 1905, published at Washington in 1906, has two articles dealing with yellow fever and the part played in its transmission by mosquitos. One of these, 'The Fight against Yellow Fever,' reviews the history of yellow fever epidemics, and traces the introduction of the disease from tropical America to other parts of the world, showing how, in the light of present knowledge, the mosquito could be, and in all probability was, responsible for every outbreak of the disease.

During the American occupation of Cuba (in 1900), it was proved that the mosquito was the sole agent for the dissemination of yellow fever, and in 1901 it was decided to fight the pestilence in Havana by the destruction of the mosquito, and in that way only; and the events have fully justified the resolve, for Havana, from being one of the worst places in the world for yellow fever, is now a clean city and for several years has been practically free from the disease.

The same signal success was obtained in Rio de Janeiro, and at Dakar in West Africa, where on May 29, 1905, an imported yellow fever patient died of the disease. Extreme precautions were taken, based on the work in Havana and Rio de Janeiro, and as a result no other cases developed.

The second article referred to above is entitled 'Walter Reed; A Memorial.' This gives an account of the life and work of Dr. Reed, who was, in 1900, sent to Cuba as President of the Board of Commissioners to study the infectious diseases of the country, but more especially yellow fever. It was through the experiments of this Board that the

exact relationship between the *Stegomyia* mosquito and yellow fever was established. The following paragraph is quoted from this memoir:—

'The details of the experiments are most interesting, but it must here suffice to sum up briefly the principal conclusions of this admirable board of investigators, of which Reed was the master mind:—

- (1) The specific agent in the causation of yellow fever exists in the blood of a patient for the first three days of his attack, after which time he ceases to be a menace to the health of others.
- (2) A mosquito of a single species, *Stegomyia fasciata*, ingesting the blood of a patient during this infective period is powerless to convey the disease to another person by its bite until about twelve days have elapsed, but can do so thereafter for an indefinite period, probably during the remainder of its life.
- (3) The disease can not in nature be spread in any other way than by the bite of the previously infected *Stegomyia*. Articles used and soiled by patients do not carry infection.'

### TURTLE FISHING IN THE CAYMAN ISLANDS.

In the *Agricultural News*, Vol. V, p. 403, there appeared a note on the turtle trade of the West Indies, but no particular mention was made of the Cayman Islands. The recently issued *Colonial Report* on this dependency of Jamaica contains interesting information on the turtle trade:—

The turtle shipped to England and America is the green turtle. Since 1901, the average number of these turtles caught has been 2,847. Last year the number was 3,419, the value of the exports being £5,657.

The hawk's-bill turtles are killed when caught, the shell being taken off. A full-grown turtle gives 5 lb. of shell, the price of which is at present 24s. per lb. In the year 1901-2, 930 lb. were exported, the value (at 16s. per lb.) being £744; last year the exports amounted to 1,403 lb., and the value (at 24s.) was £1,543.

The Acting Commissioner states: 'Our fishermen kill these turtle humanely, but the Mosquito Indians, who get a fair quantity of shell, are said to strip off the shell with a hot knife, without killing the turtle, and then release them in salt-water lagoons, when new shell grows.'

The *Journal of the Society of Arts*, for January 18, contains an article on tortoise- or turtle-shell. The hawk's-bill turtle, which furnishes the 'tortoise-shell' of commerce, is found in the Gulf of Mexico and the Caribbean Sea. Its upper jaw is prolonged and hooked like the beak of a hawk. It has thirteen overlapping plates of 'tortoise-shell' on its back. Old turtles have also a thin, yellow plate on the belly, which is much sought after and commands a higher price. The price of 'tortoise-shell' at Panama varies between 12s. 6d. and £1 5s. per lb. The best prices are obtained in England. In 1905, there were 16,000 lb. of 'tortoise-shell' exported from Colon, most of which went to England.

### DEPARTMENT NEWS.

The Imperial Commissioner of Agriculture for the West Indies sailed in the S. S. 'Ocamo' on a tour in the Northern Islands on April 14. It is probable that Sir Daniel Morris will return to Barbados on or about May 9.



## CALABASH OR GOURD PIPES.

In a short article in the *Agricultural News*, Vol. V, p. 399, on the subject of gourd or calabash pipes, it was mentioned that the Imperial Commissioner of Agriculture was endeavouring to obtain further information on the subject. A specimen of a half-completed pipe has been received from Cape Town and is shown below (fig. 11).

Reference is made to the above-mentioned article by Mr. J. R. Jackson, in the *Gardeners' Chronicle*, of March 2. Mr. Jackson says: 'My first acquaintance with the new pipe was made about six or eight months back, when I was shown one which had been brought home by a friend from the Cape.



FIG. 11. CALABASH PIPE.

It was described as a South African calabash or gourd, lined with some substance said to be meerschaum. As the smaller gourds are often used for pipes in tropical countries, I was not specially attracted by this particular pipe, except for its lightness, and I attributed it to the well-known *Lagenaria vulgaris*.

More recently, however, in the catalogue of one of the largest of English tobacco and pipe merchants, I found the "South African gourd pipe" spoken of as being in extraordinary demand in England, so much so that the stocks in the market had run very low, but at the present time regular consignments of genuine calabash pods (so-called) were arriving, apparently in the raw state, as the pipes are said to be "hand finished" in this country. . . The advantage of these pipes over the ordinary wood pipes is said to be their porous nature, so that the nicotine is readily absorbed, thereby ensuring a clean, cool, dry, and consequently hygienic pipe.'

Mr. Jackson also states that, not having seen the fruit in the rough or natural state, he is unable to say whether the pipes are made from a cucurbitaceous plant—and if so, from *Lagenaria vulgaris*—or from the true calabash (*Crescentia Cujete*). It would appear to be more likely that the former plant is the one from which these fruits are obtained. Its fruits are called calabashes in South Africa.

*Lagenaria vulgaris* is found in all tropical countries. In India it is known as the 'bottle gourd.' Grisebach records it from Jamaica and Antigua. The fruit, which is very variable in shape, has a smooth, hard shell, rendering it useful for drinking cups, water jugs, and many domestic utensils.

## EELWORMS.

Circular No. 51 of the *Comisión de Parasitología agrícola*, of Mexico, deals with the eelworm (*Heterodera radicicola*), which has been found attacking the roots of the coffee in two localities in Mexico. As eelworms attack the roots of several economic plants (tomatoes, tobacco, etc.) in the West Indies, a summary of the article may be useful.

The eelworms, which are of microscopic size, bore into the finer roots of the coffee within which they live. They produce tubercles, varying in size from the head of a pin to a grain of wheat, or cylindrical swellings of some length.

On examining a section of the root with the microscope, eelworms may be seen living in the plant tissues. Oval opaline bodies are also visible, which are the full-grown females. These change into sacs completely full of eggs. The eggs are grey, granular, and oval, and about  $\frac{1}{12}$  mm. long. In some of them, embryo eelworms may be seen.

If the eelworms attack only part of the root system, the plants may live for some months; but if all the roots are attacked the coffee trees die in eight to fifteen days. The trees seem most liable to this disease when from four to ten years old. The most important factors which favour the development of this disease are: a sandy soil, abundant moisture, and the growth of weeds or cultivated plants between the coffee trees.

The following are the symptoms shown by coffee trees attacked by eelworms: the leaves hang down, lose their lustre, turn pale-green and then yellow, their margin becomes wavy, and they fall readily. In the case of a violent attack, the colour of the leaves changes at once from bright-green to dark-grey, and the coffee tree looks as if it had been parched by fire. The shoots become desiccated and their bark wrinkles and separates easily from the wood, while the rootlets will be found beset with tubercles.

If the finest rootlets of the coffee are examined and tubercles are found on them, the following remedies may be used:—

(1) Gasoline or benzine, applied with a Vermorel injecting syringe, 4 inches below the soil; about  $\frac{1}{2}$  oz. to  $\frac{1}{4}$  oz. to a tree. Repeated after two months.

(2) Sulphate of iron,  $1\frac{1}{2}$  oz. to 3 oz. spread round each tree.

(3) Carbon bisulphide, introduced with an injecting syringe into the soil, using less than 1 oz. for each square yard, in three applications. This is efficacious but expensive.

(4) Calcium carbide, 1 part being put in 25 parts of water. When gas has ceased to come off, the liquid can be injected, using about  $1\frac{1}{2}$  oz. per square yard in four or five injections. This method has been successfully and economically used to combat the Phylloxera of the grape vine and also the coffee eelworm.

Coffee or other trees which have been killed by eelworms should be burned along with all their roots. The soil where they grew should be disinfected with quicklime. Nothing should be planted on the same spot for at least two years.

At Cuernavaca the eelworm disease seemed to be chiefly developed in the bananas or plantains, which are tolerant of it. Hence these plants should not be grown as shade for coffee.

## TOBACCO IN JAMAICA.

The following reference is made to the cultivation of tobacco in Jamaica in the *World's Commercial Products*:—

In Jamaica the cultivation of tobacco has lately received much attention. The soil, climate, and general conditions are very favourable in many parts of the island, and the area at present under tobacco is about 400 acres. The tobacco trade has progressed very satisfactorily during the past eleven years. Jamaica cigars and cigarettes, which are manufactured at Kingston, have gained a very enviable reputation in the market, and the industry may now be considered to be well established. In the opinion of many experts, Jamaica cigars are the finest produced in the British Empire. The exports in 1904-5 were valued at £22,408, as compared with a value of £19,567 in the preceding year, and these figures are exclusive of the locally grown tobacco consumed in the island.





## GLEANINGS.

The Manager of the Cul-de-sac Usine in St. Lucia writes: 'The B. 208 ratoons have given a good return, some 36 tons to the acre, and I am putting in all the plants of that variety I can get.'

The March issue of the *Journal of the New York Botanical Garden* contains a report on a visit to Jamaica, undertaken by Dr. Marshall A. Howe, for the purpose of collecting marine algae.

The cup presented by the late Sir Courtenay Knollys for the best school exhibit at the Antigua Agricultural Show was this year awarded to the St. Mark's school, of which Mr. David A. Osborne is master.

The exports of rice from British Guiana, during the year ended March 31 last, amounted to 3,474,512 lb., valued at \$89,078, the corresponding figures for the previous year being 29,728 lb. and \$718. (*Demerara Argosy*.)

The Agricultural Instructor for Nevis reports that the cultivation of chillies or capsicums has turned out very satisfactorily in most places. 'If anything like the last price is obtained, it should prove encouraging to the growers.'

The *Hawaiian Forester and Agriculturist*, for February, mentions that last year's crop of the navel oranges lately planted in Hawaii bore fruit of very small size. Fertilizers were, in consequence, applied to a certain number of the trees, which have this year borne fruit of large size, while the unfertilized trees again bore small fruit.

Attention is directed to a slip which accompanies this issue of the *Agricultural News*, announcing that specially selected and disinfected cotton seed, grown in the West Indies and recommended for sowing during the coming season (May to August) will be available for distribution (not including bags or freight) at 3d. per lb.

In 1905, the total imports of oranges into the United Kingdom were 5,068,526 cwt., valued at £1,949,496. The total imports of oranges from British possessions were only 104,901 cwt.; of these no fewer than 103,257 cwt. were from the West Indies, which produce excellent fruit. (*The World's Commercial Products*.)

In distributing the prizes won at the recent Agricultural Show at Antigua, his Excellency the Governor commended the excellent brooms made from broom corn, and expressed regret that the people did not take up this industry, seeing that the brooms could be profitably produced and placed on the market at a cheaper rate than those imported.

A correspondent writes as follows in regard to the manufacture of citrate of lime in the West Indies: 'I am not yet convinced of the advantage of making citrate so long as the citric acid sells at no higher price in the form of citrate than it does in the form of concentrated juice. Should the buyers pay higher prices for the acid in the form of citrate, the case is different and becomes a matter for calculation.'

In the *Journal of the Society of Arts*, for March 15, a paper on recent developments in economic botany refers to the statement that every motor-car requires about £50 worth of rubber a year, and every motor-bus £200 worth. On this basis it is estimated that the motor-bus industry alone would, by the close of the present year, consume annually about 1,000 tons of rubber, and would cause a constantly increasing demand for rubber.

The same paper states that a new concentrated food is being manufactured with bananas as a basis. The banana pulp is dried, granulated, and ground to powder. This is mixed with the essential oil from the banana peel, dried milk powder, extract of malt, ground cacao, and sugar. This product is stated to possess all the elements of a complete food, namely, proteids, fats, and carbohydrates, in a concentrated form.

A correspondent in St. Lucia writes as follows in regard to the assistance afforded to young men coming to the island to take up planting: 'These new settlers are exceedingly fortunate in being able to get experienced advice from the Department and their neighbours; it is worth hundreds of pounds to them; and I frequently contrast their position with that of myself and others twenty years ago, when experience could be bought only by trials, and frequently by failure.'

In the *Tropenpflanzer*, for March, a communication from the Marianne Islands states that the inhabitants make great use of dried bread-fruit. The fruits when nearly ripe are peeled, cut into slices, and dried in ovens. This dried bread-fruit can be eaten like biscuits. A chemical analysis at Berlin University gave: moisture, about 6 per cent.; fat, about 1; proteid about 4; starch, about 60; and sugars, dextrin, and the like, about 18 per cent. Hence, such dried bread-fruit possesses a high nutritive value.

According to *L'Agriculture pratique des pays chauds*, for February, samples of Sea Island cotton grown in Guadeloupe were sent to France for valuation. The French Colonial Cotton Association reports that the first sample was of good quality, but badly prepared and badly ginned, being soiled by crushed seeds. Well-prepared cotton of this character would be worth 1s. 5d. per lb., at which price was sold a bale of the cotton, properly ginned, and weighing 110 lb., subsequently sent to the Association from Guadeloupe.

The judges in the prize-holdings competition of the Jamaica Agricultural Society report that the competition has produced marked results among the peasant proprietors. In a recent competition carried out by the *Daily Telegraph*, a prize was offered for the best sample of coffee produced and cured by peasant proprietors. The judge, who was one of the most experienced produce merchants in the island, expressed himself in glowing terms on the quality of the exhibits. This journal remarks: 'Substantial progress has been made by the peasantry in the art of tillage and curing the products.'



## AGRICULTURAL PROGRESS IN DOMINICA.

In his opening address to the members of the Legislative Council of Dominica, on March 28, his Honour the Administrator referred as follows to the work of the Imperial Department of Agriculture in Dominica and to the general agricultural progress of the island:—

Provision has also been made on the estimates for the upkeep of the Botanical Department of the island at a cost of £610 to current revenue and £1,140 to Imperial funds, the same as in the previous year; in all £1,750.

You are aware, Gentlemen, that the grant from Imperial funds, which, in common with other islands in the British West Indies, this island has enjoyed for some years past, will be progressively diminished from April 1, 1908, and that from April 1, 1912, at the latest, the whole cost of the Botanical Department of this island must be borne by local funds. I am informed that the reduction of the grant as regards Dominica will presumably be at the rate of not less than £300 a year.

The prosperity of Dominica in the last few years owes much to the impetus given by the creation, and maintenance from Imperial funds, of the Department of Agriculture in the West Indies. The industry of this island has profited directly by the able advice at all times readily afforded by Sir Daniel Morris, K.C.M.G., the Imperial Commissioner, and his staff of technical officers, and by the establishment of a local Department of Agriculture, which has been modelled and conducted by him. I have no reason to believe that, when the time arrives, you will not be prepared to continue, at the entire cost of the island, a Department of this service which has proved itself so beneficial to the interests of the island.

The year 1906 has been one of marked prosperity for Dominica, and there is every indication throughout the island of an abundant harvest during the present year. The industry of the people of Dominica during recent years affords evidence of their well-being to-day.

No more than ten years ago the total value of the imports of the island for the year was declared at £64,477 and the exports at £51,438. Five years later, in 1901, they had increased to £79,386 and £66,892, respectively, while last year the declared value of the imports was £103,224 and of the exports £106,246. In other words, in ten years the annual trade of the island has increased from £115,915 to the unprecedented sum of £209,470.

The value of the imports and exports last year exceeded that of the previous year by £7,866 and £28,211, respectively.

The increase in the value of the exports last year is due, not so much to increased production, as to the higher market prices obtained during the year. The lime industry, however, shows some development. During the year 300,003 gallons of lime juice, valued at £44,486, were exported, compared with 289,100 gallons, valued at £32,966, exported during the previous year. In the fruit trade there was also an increase from 13,564 barrels of fresh limes, valued at £4,747, exported in 1905, to 15,799 barrels, valued at £5,530, exported in 1906.

Cacao, on the other hand, showed a falling off from 1,326,062 lb., exported in 1905, to 1,274,634 lb., exported during the year 1906; but, owing to the higher prices ruling, the declared value of the cacao exported last year was £35,185, compared with £25,554 during the previous year. The shortage in the output of cacao was not confined to

Dominica, but was general amongst other cacao-producing centres. It is looked for that the crop of cacao in Dominica this year will outweigh that of the year 1905.

Among the exports of Dominica produce and manufacture last year, citrate of lime formed an item for the first time, when 733 cwt. were shipped, valued at £1,503. This new industry amongst us has its beginning at the Bath estate. The citrate manufactured gave most satisfactory and promising results, and it is expected that during the present year the export of citrate of lime will show a considerable increase on the previous year. It is possible that in the near future the manufacture of citrate of lime will rank amongst the more important industries of the island.

An Ordinance will be submitted to you to provide for an export duty on citrate of lime equivalent to the export duty now paid on concentrated lime juice, and to exempt chalk or lime, imported for the manufacture of citrate of lime, from the payment of customs duties.

Amongst other matters of legislation to be submitted to you is an Ordinance to provide against the importation of articles likely to introduce disease amongst plants. This measure has been introduced at the suggestion of Sir Daniel Morris for the protection of the cultivation of the island.

Dominica has grown, and is annually growing, on a solid foundation in the wealth of her resources. Those resources are being opened out and applied year by year. During the past ten years many new-comers have settled in the island. Some have acquired private lands under cultivation, others have purchased upwards of 5,000 acres of forest land from the Crown, which they are now actively clearing and placing under cultivation. The peasant proprietors have also acquired, within the same period, some 1,200 acres of Crown land.

At the present moment two projects are being worked out by private parties for the development of the timber industry and occupation of the forest lands as they are cleared. In connexion with these schemes, the proposed construction of tramways to facilitate the transport to the sea-board, not only of the timber cut, but also of produce from the interior of the island, forms an important part. I feel sure you share with me the hope that these undertakings will be brought to a successful issue.

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### ST. KITTS'S AGRICULTURAL SHOW.

In reference to the Agricultural Show held at St. Kitt's on March 11, of which mention was made in the last issue of the *Agricultural News* (p. 106), it may be stated that the prizes were distributed by his Honour the Administrator at a special meeting of the Agricultural Society on March 22.

Mr. Roxburgh congratulated the society on the success of the show. The Hon. Dr. Watts, C.M.G., presented the Diplomas of Merit of the Imperial Department of Agriculture. Of the show Dr. Watts writes:—

The exhibits in some classes were very good; but in others, particularly in the vegetable classes, they were poor and in many cases badly displayed. These are the natural defects of first attempts.

There was only one school exhibit which was fair for a first attempt, and goes to indicate that better work will be done in future.



## THE MANAGEMENT OF ANIMALS.

The following notes on the management of animals are contained in Leaflet No. 20, issued by the Royal Society for the Prevention of Cruelty to Animals:—

(1) Every one intending to keep animals should first learn what is requisite for the health and happiness of each, and, if unable to provide it a suitable home, a sufficient and punctual supply of wholesome food, and opportunities of healthy recreation, should at once decide *not* to keep it.

(2) Animals should be used very gently, though firmly. We should remember that seeming obstinacy may arise from pain, fear, or irritation, of which we do not perceive the cause, but which may be soothed by quiet patience.

(3) Frequent, kind and cheerful notice is essential to the well-being of all animals in captivity. It is selfish and cruel to imprison, and so to deprive them of variety, exercise, and the society of their own kind, and give no compensation, such as gentle talk, caressing, and amusement, whenever it is possible. If this is too much trouble, it is better *not* to keep them at all.

(4) All animals are the better for having a proper and comfortable bed, or roost, or a quiet shady nook to sleep in; and their rest should be undisturbed. Do not wake them up to gratify curiosity, or to clean their dwellings at unreasonable hours.

(5) Be careful to remove any cause of fear; this is only just to creatures which we have deprived of the freedom to escape from distress.

(6) Avoid all harness which interferes with the free, natural action of animals.

(7) Animals should always have access to shelter and shade, when they desire it.

(8) Sheds, cages, etc., should always be well drained and freely lighted and ventilated, but never draughty.

(9) It is absolutely necessary for health and comfort that in every case the dwelling, yard, cage, and bed should be kept thoroughly clean, to destroy vermin, prevent smell, and also the retention of stale, and therefore unwholesome food. This should be done early in the morning, to avoid hindrance and interruption, and because it is better for the animal to have fresh food and water than that which has been kept in a close dwelling all night. Feed nocturnal animals at sunset.

(10) When pebbles are required for the bottom of tanks, cages, etc., smooth ones should be procured; they should be sifted fine, and thoroughly washed before use.

(11) Except in small cages, branches or sprigs of dead trees are better for perches than straight bars of wood; because the varying size of the stem brings all the muscles of the foot or claw into action. Where horizontal perches are necessary, they should have flattened sides and bevelled edges; a bird will then secure a firm grasp, and be less likely to fall forwards when asleep than if they were circular.

(12) Placing the food in vessels, rather than scattering it loose, keeps it clean and prevents waste.

(13) All vessels used for food or water should be washed daily, and wiped dry before refilling; otherwise food may turn sour, or the sediment from water will accumulate and render the fresh supply unwholesome. Iron troughs, or plates lined with porcelain, are the best, being clean, cheap, and durable.

(14) All food should be fresh and of good quality. Where the times of feedings are not regulated by practice, nor specified in detail by manuals, food should be kept always

within reach, but every day what is left and stale should be carefully removed, and fresh supplies offered. Milk, especially, should be quite fresh, and always boiled before use.

(15) As a rule, give as much solid food daily as the animal will habitually eat up clean; green stuff, etc., may be given in addition. The food should be varied and resemble as much as possible that which the creature would select in its natural state.

(16) Every animal should have a constant supply of pure water for drinking. In good stables water is now kept constantly in enamelled mangers close to the heads of horses.

(17) Water for bathing should be furnished daily for animals requiring baths, in a separate vessel, adapted to the form and convenience of the creature using it. Frequent washing is a great delight to many animals and a useful preventive of vermin.

(18) Take pains to ascertain the fitting temperature for each animal. Much suffering is caused by thoughtless persons, who are ignorant of the degrees of heat or cold which animals are by nature or habit able to endure.

(19) When an animal is sick, secure for it a shady, quiet, and unmolested retreat; and take care that its treatment at such times is kindly and gentle. This will ensure an abundant return of your patient's gratitude. See, also, that, besides useful food, it has food which it can eat and is most welcome to it.

(20) When an animal must die, always secure the services of a humane and experienced person to destroy it in the quickest and least painful way; and be sure that it is really dead before it is removed. If drowned, the animal should be left in the water at least an hour. Nothing can excuse the brutality of those who, to save expense in this, suffer animals, for whose welfare they are responsible, to be 'strayed,' that is, starved, or left behind alone on change of residence, to endure protracted misery, or to burden and distress their most sensitive neighbours.

(21) Never fail to bury dead animals at once; this is necessary for the health of the living. The casting of dead cats, kittens, or rats, on to dust-heaps or public thoroughfares, is a disgusting practice; it outrages the feelings of all decent people, and is a disgrace to those who permit it.

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## THE MANAGEMENT OF SHEEP.

The following hints on the management and care of sheep in British Guiana, prepared by Mr. J. A. Raleigh, Government Veterinary Surgeon, have been published by the Board of Agriculture:—

Before going into the management and care of sheep, I think it my duty to remark that I do not consider British Guiana a sheep-breeding country, that is, the mud flats of British Guiana. The pastures are entirely too damp, and parasitic diseases too prevalent (the most important being Strongylosis, on which I have already contributed a treatise) to make sheep breeding the great success that it is in many other countries. The methods adopted here in the breeding of sheep are so crude that they can be improved on quite easily, and with great success.

*Breeds.*—The most suitable sheep for a tropical climate are the Down-breeds, on account of their short wool; this breed also produces high-quality mutton, and is very active.

*The Flock.*—Ewes should not be allowed to run with the rams until they are two years old, as before that time they



have not properly matured, and it is remarkable what a great difference it will make in the size and build of the progeny if this rule is adhered to; the ewes will also last longer. This rule does not affect young rams as they have not got to undergo the trials of gestation and nursing. The flock should be composed of one-fourth two-tooth ewes, one-fourth four-tooth ewes, one-fourth six-tooth ewes, and one-fourth of full-mouthed and over-year ewes.

*Improving a Flock.*—To maintain a good, strong, and up-to-standard flock, it is necessary that the weaklings should be weeded out every year, and that new blood should be introduced in the way of fresh rams.

*Feeding.*—The feeding of sheep in this colony is a comparatively easy matter, as we have grass on the pastures the whole year round. As to feeding with grain, that would become expensive, but I am certain it would be advantageous to owners if they fed up their wethers for a few months before selling them to the butchers. Rock salt should be kept in the pastures for the sheep to lick whenever they feel inclined.

*Docking.*—It is important that lambs should be docked when they are about a month old, for it not only improves their appearance, but renders them less difficult to handle; it also may tend to broaden the hind quarters. The operation is simple and can be done by any one. The tail is generally removed close to the rump, or about 3 inches lower down, according to fashion, and is cut off either with a knife or a sharp hot iron; the latter method being the safer as it prevents hemorrhage.

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## IMPERIAL DEPARTMENT OF AGRICULTURE.

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### Sale of Pedigree Stock.

The following animals, the property of the Imperial Department of Agriculture for the West Indies, are offered for sale:—

One *Devon Bull*, now at Montserrat; about three years old; purchased from the Royal Farms, Windsor, in 1904. Original cost, £40; offered for £25.

One *Hereford Bull*, imported from Canada in 1902; about seven years old; now at Montserrat. Original cost, £35; offered for £15.

One *Berkshire Boar*, now at Montserrat; not quite four years old; imported from the Royal Farms, Windsor, in 1904; original cost, £8; offered for £4.

One *Pony Stallion 'Norman'*; now at Nevis. Bay, with black points; 14½ hands; twelve years old; purchased in Jamaica in 1900. Original cost, £55; offered for £25.

One fine *Ayrshire Bull*, 'Stamp' 3rd., now at St. Kitt's; four years old; imported from Canada in January 1907. Original cost, £24; offered for £20.

The animals may be seen and examined in the several islands named, on application to the local officer of the Department of Agriculture. They are all believed to be in sound condition, but the Department is not prepared to incur any responsibility on this point. In cases where any of the animals may be required to be shipped to another island, the actual expenses incurred would require to be paid in addition to the prices above stated. Offers up to May 15 next may be forwarded to:—The Imperial Commissioner of Agriculture for the West Indies, Head Office, Barbados.

## THE CULTURE OF COCA IN JAVA.

The following notes are abstracted from a comprehensive paper in the *Tropenpflanzer*, for February 1906, by Dr. H. Winkler:—

The two most important plants which yield cocaine are *Erythroxylon Coca* (called Huanaco in South America) and *Erythroxylon Coca*, var. *nova-granatense* (called Truxillo coca by the planters). The former yields usually twice as much cocaine as the latter, and requires a site of considerable elevation. A variety of this species is grown in Java. The Truxillo coca can be grown at low levels within the tropics, and is grown in Ceylon below 2,000 feet. All the coca plants in Java are descended from two individuals which were sent to Buitenzorg in 1878. Javanese coca leaves are found to contain only a little more than half as much cocaine as the South American leaves. The whole coca-leaf produce of Java goes to Amsterdam, where are the factories which prepare commercial cocaine from the dry leaves. The latter are worth in Europe from 6½d. to 7¼d. per lb.

The coca plant in Java requires much the same climate, soil, and cultivation as tea, which is often grown in the same plantation with it. The best elevation is between 900 feet and 2,100 feet, and the proper temperature between 75° F. and 86° F. Any dry period is injurious to the plant. The coca requires no manures except, in some cases, an application of nitrogen. Shade is unnecessary and lessens the percentage of alkaloid.

Two-year-old plants produce abundance of seed, which is sown in special seed-beds at the beginning of the rainy season. The seedlings are planted out when two or three months old at distances of 3 feet 6 inches to 3 feet 10 inches. The first picking of leaves may take place after about one and a half years, but must be a very light one. After this, up to four pickings may be made every year, but less in dry situations. The plantations in Java are replanted after about eighteen years. The young shrubs are headed and pruned, and the lower branches left untouched at the first picking, and until they have grown vigorously. Picking is done by women and children who are used to picking tea leaves. The pickers may reach a maximum of 14 lb. a day. Only the three or four terminal leaves are picked and put in the baskets, the rolled-up leaves, forming the terminal bud, being nipped off and thrown away. Artificial drying must be employed, since much of the alkaloid is lost when the leaves are dried in the sun. A hot air temperature between 190° F. and 148° F. is required. The drying requires thirty-six to forty hours. The leaves are usually powdered, and the powder is packed in tins, which hold about 165 lb. An average return is said to be 720 lb. per acre.

The culture of coca is regarded in Java as being at least as remunerative as that of tea, the leaves of which require expensive preparation.

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## ST. LUCIA AGRICULTURAL SCHOOL.

Addressing the Legislative Council in St. Lucia on February 28, 1907, his Honour the Administrator said:—

A sum of £335 has been included for the purpose of placing under cultivation an increased area at the Agricultural School at Union for the production of vegetable foodstuffs for use in the public institutions. This initial outlay will, it is hoped, result in savings in the cost of the institutions, as soon as the crops mature, and the example of the production of these foodstuffs on a commercial scale will be a valuable object-lesson to the pupils and to the general public.



## MARKET REPORTS.

London,—March 26, 1907. 'THE WEST INDIA COMMITTEE CIRCULAR,' Messrs. KEARTON, PIPER & Co.; Messrs. E. A. DE PASS & Co., March 22, 1907; 'THE LIVERPOOL COTTON ASSOCIATION WEEKLY CIRCULAR,' March 22, 1907.

ARROWROOT—St. Vincent, 2 $\frac{3}{4}$ d. per lb.  
BALATA—Sheet, 2/3 to 2/7; block, 1/10 to 1/10 $\frac{1}{2}$  per lb.  
BEES'-WAX—£7 10s. to £8 per cwt.  
CACAO—Trinidad, 85/- to 90/- per cwt.; Grenada, 76/- to 81/- per cwt.  
COFFEE—Jamaica, good to fine ordinary, 43/- to 47/-; greenish to fine, 51/- to 120/- per cwt.  
COPRA—East Indian, £28 to £28 5s. per ton.  
COTTON—Good medium fine, 6'85d.; West Indian Sea Island, good medium, 19 $\frac{1}{2}$ d.; medium fine, 20 $\frac{1}{2}$ d.; fine, 22d.; prices paid, 8 $\frac{1}{2}$ d. to 25d.  
FRUIT—  
GRAPE FRUIT—10/- to 12/- per box.  
BANANAS—Jamaica, 4/- to 6/- per bunch.  
ORANGES—No quotations.  
PINE-APPLES—St. Michael's, 2/6 to 5/6 each.  
FUSTIC—£4 5s. to £4 15s. per ton.  
GINGER—Jamaica, common, 65/- to 70/-; medium to fine, 72/- to 90/- per cwt.  
HONEY—20/- to 25/- per cwt.  
ISINGLASS—West Indian lump, 1/8 to 1/11 per lb.; cake, no quotations.  
LIME JUICE—Raw, 1/2 to 1/6 per gallon; concentrated, £24 per cask of 108 gallons; Distilled Oil, 2/10 to 3/- per lb.; hand pressed, 3/3 to 3/6 per lb.  
LOGWOOD—£4 5s. to £4 15s.; roots, £3 5s. to £4 5s. per ton.  
MACE—Pale, 1/7 to 1/11; red, 1/5; broken, 1/2 per lb.  
NUTMEGS—64's, 1s. 1d.; 83's, 10d.; 105's, 7d.; smalls, 5 $\frac{1}{2}$ d. to 6d. per lb.  
PIMENTO—Fair, 2 $\frac{1}{4}$ d. to 2 $\frac{3}{4}$ d. per lb.  
RUM—Jamaica, 2/9; Demerara, 1/- per proof gallon.  
SUGAR—Crystals, low to good yellow, 16s. to 17s. 6d.; Muscovado, 89 test to Refiners, 9/- in bond; Molasses, 11/- to 14/- per cwt.

Montreal,—January 18, 1907.—Mr. J. RUSSELL MURRAY.  
(In bond quotations, c. & f.)

COCOA-NUTS—Jamaica, \$27.00; Trinidad, \$25.00 per M.  
COFFEE—Jamaica, medium, 10c. to 12c. per lb.  
GINGER—Jamaica, unbleached, 13c. to 14c. per lb.  
MOLASSES—Barbados, 27c. to 28c.; Antigua, 25c. to 26c. per Imperial gallon.  
NUTMEGS—Grenada, 110's, 15c. to 16c. per lb.  
PIMENTO—Jamaica, 5 $\frac{1}{4}$ c. to 5 $\frac{1}{2}$ c. per lb.  
SUGAR—Grey crystals, 96°, \$1.98 to \$2.05 per 100 lb.  
—Muscovados, 89°, \$1.40 to \$1.50 per 100 lb.  
—Barbados grocery, \$2.10 to \$2.25 per 100 lb.

New York,—March 22, 1907.—Messrs. GILLESPIE BROS. & Co.

CACAO—Caracas, 18 $\frac{1}{2}$ c. to 19c.; Grenada, 17c. to 17 $\frac{1}{4}$ c.; Trinidad, 18c. to 18 $\frac{1}{2}$ c.; Jamaica, 15c. to 17c.; Dominica, 16c. to 16 $\frac{1}{2}$ c. per lb.  
COCOA-NUTS—Jamaica, \$25.00 to \$26.00; Trinidad, \$24.00 to \$25.00 per M.  
COFFEE—Jamaica ordinary, 8c. to 8 $\frac{1}{4}$ c.; good ordinary, 8 $\frac{3}{4}$ c. per lb.  
GINGER—Dark scraggy root, 11 $\frac{1}{4}$ c. to 12c.; small to bright bold, 12 $\frac{1}{2}$ c. to 15c. per lb.  
GOAT SKINS—Jamaica, Antigua, and Barbados, 59c.; St. Kitt's, St. Thomas, and St. Croix, dry flint, 54c. to 56c. per lb.  
GRAPE FRUIT—Jamaica, \$4.00 to \$5.50 per barrel; \$3.00 to \$3.50 per box.  
LIMES—No quotations.  
MACE—28c. to 36c. per lb.

NUTMEGS—95's to 100's, 17 $\frac{1}{2}$ c.; 100's to 110's, 13c.; 130's to 140's, 12c.

ORANGES—Jamaica, \$4.00 to \$5.00 per barrel; \$2.50 to \$3.00 per box.

PIMENTO—5 $\frac{1}{4}$ c. per lb.

SUGAR—Centrifugals, 96°, 3.51c. to 3.55c.; Muscovados, 89°, 3.01c. to 3.05c.; Molasses, 89°, 2.76c. to 2.80c. per lb., duty paid.

## INTER-COLONIAL MARKETS.

Barbados,—April 8, 1907.—Messrs. T. S. GARRAWAY & Co., and Messrs. JAMES A. LYNCH & Co., April 9.

ARROWROOT—St. Vincent, \$4.00 to \$4.75 per 100 lb.  
CACAO—Dominica, \$14.50 per 100 lb.  
COCOA-NUTS—\$14.00 per M. for husked nuts.  
COFFEE—\$10.10 to \$10.50 per 100 lb.  
HAY—\$1.00 to \$1.30 per 100 lb.  
MANURES—Nitrate of soda, \$65.00; Ohlendorf's dissolved guano, \$55.00; Cotton manure, \$42.00; Cacao manure, \$42.00 to \$48.00; Sulphate of ammonia, \$75.00; Sulphate of potash, \$67.00 per ton.  
MOLASSES—15c. per gallon.  
ONIONS—Antigua, \$3.00 per 100 lb.  
POTATOS, ENGLISH—\$3.25 per 160 lb.  
RICE—Demerara, \$5.65 to \$5.75; Ballam, \$5.50 to \$5.90 per bag (190 lb.); Patna, \$3.00 to \$3.75; Rangoon, \$2.70 to \$2.90 per 100 lb.  
SUGAR—Dark crystals, \$2.10; Muscovado, \$1.65 per 100 lb.  
SYRUP—17 $\frac{1}{2}$ c. per gallon.

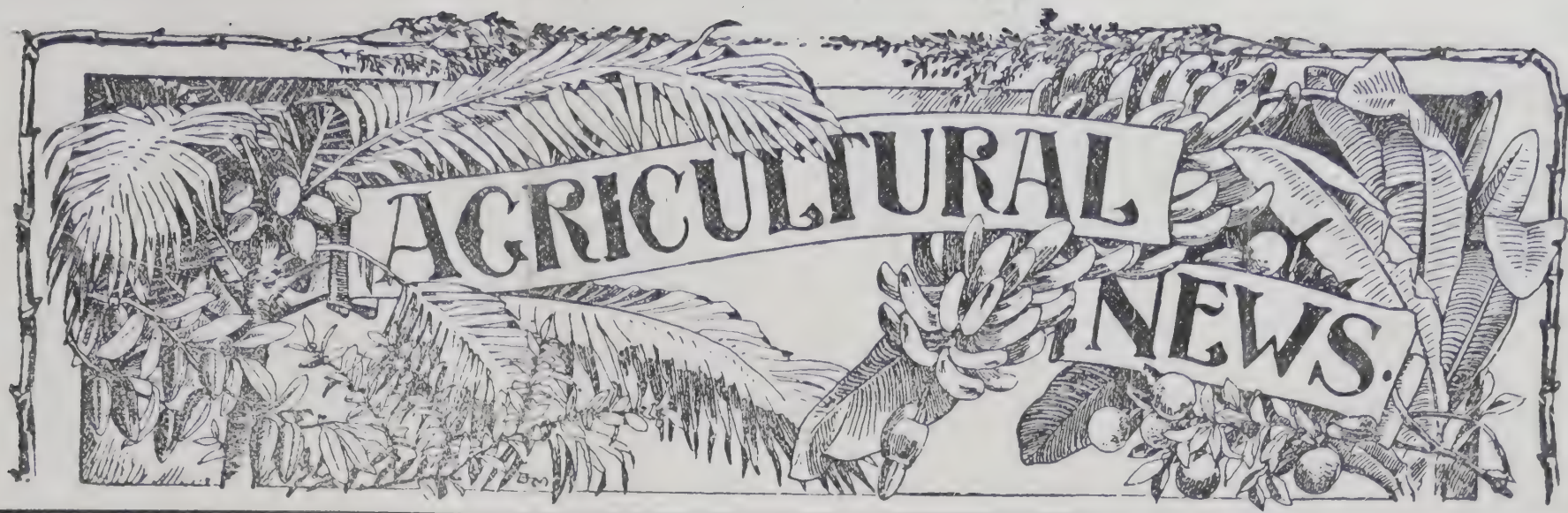
British Guiana,—April 13, 1907.—Messrs. WIETING & RICHTER.

ARROWROOT—St. Vincent, \$11.00 per barrel.  
BALATA—Venezuela block, 32c.; Demerara sheet, 48c. per lb.  
CACAO—Native, 17c. to 18c. per lb.  
CASSAVA—60c. to \$1.00 per barrel.  
CASSAVA STARCH—\$6.00 per barrel.  
COCOA-NUTS—\$12.00 to \$16.00 per M.  
COFFEE—Creole, 14c. to 15c.; Jamaica, 14c. to 14 $\frac{1}{2}$ c. per lb.  
DHAI—\$4.30 to \$4.65 per bag of 168 lb.  
EDDOS—\$1.00 to \$1.56 per barrel.  
MOLASSES—16c. per gallon.  
ONIONS—Lisbon, 4c. to 4 $\frac{1}{2}$ c. per lb.  
PLANTAINS—20c. to 40c. per bunch.  
POTATOS, ENGLISH—Nova Scotia, \$2.90 to \$3.00 per barrel.  
POTATOS, SWEET—Barbados, \$1.68 per bag.  
RICE—Ballam, \$5.90 to \$6.00 per 177 lb.; Creole, \$4.75 to \$4.80 per bag (ex store).  
SPLIT PEAS—\$5.80 per bag (210 lb.).  
TANNIAS—\$2.40 per bag.  
YAMS—White, no quotations; Buck, \$2.28 per bag.  
SUGAR—Dark crystals, \$2.00 to \$2.10; Yellow, \$2.60 to \$2.70; White, \$3.60 to \$3.70; Molasses, \$1.40 to \$1.75 per 100 lb. (retail).  
TIMBER—Greenheart, 32c. to 55c. per cubic foot.  
WALLABA SHINGLES—\$3.00 to \$5.25 per M.

Trinidad,—April 13, 1907.—Messrs. GORDON, GRANT & Co.

CACAO—Ordinary to good red, \$18.25 to \$18.50; estates, \$18.75 per fanega (110 lb.); Venezuelan, \$18.50 to \$18.75.  
COCOA-NUTS—\$21.00 per M., f.o.b.  
COCOA-NUT OIL—95c. per Imperial gallon (cask included).  
COFFEE—Venezuelan, 8c. per lb.  
COPRA—\$4.75 per 100 lb.  
DHAI—\$4.40 to \$4.70 per 2-bushel bag.  
MOLASSES—No quotations.  
ONIONS—\$3.00 to \$4.00 per 100 lb. (retail).  
POTATOS, ENGLISH—\$1.50 to \$2.00 per 100 lb.  
RICE—Yellow, \$5.50 to \$5.75; White, \$5.75 to \$6.00 per bag.  
SPLIT PEAS—\$5.40 to \$5.60 per bag.  
SUGAR—Crystals, \$2.00 to \$2.50; grey crystals, 2 $\frac{1}{4}$ c. to 2 $\frac{3}{4}$ c., c. & f.





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science to a selected number of boys of those islands; with the view to the extension of a sound knowledge as to the best methods of dealing with the staple crops and their pests.

The school buildings in each case afford ample and comfortable accommodation for from twenty to twenty-five boys. In the grounds around the schools it is possible for the boys to obtain healthy recreation, and the land attached is utilized for the production of vegetables, etc., for consumption in the schools, and for the carrying out of agricultural experiments.

Candidates for admission are strong, healthy boys of the peasant class (about fifteen years of age) who shall have passed the fourth standard in the elementary schools, or are otherwise able to show that they have reached a similar stage of attainments in school subjects. After passing a written examination, they are allowed to enter the school on probation for three months. If they satisfy the necessary conditions, they are formally admitted into the school, where they are boarded and trained, free of expense to their parents, for a period of three or four years, until they have reached the age of nineteen.

### Agricultural Schools.

**T**HE establishment of agricultural schools at St. Vincent, Dominica, and St. Lucia may be considered to be one of the chief educational efforts of the Imperial Department of Agriculture, in so far as it has been the means of affording a good practical training in agricultural

During their residence at the school they receive theoretical and practical instruction in agriculture, agricultural botany and chemistry, and in ordinary school subjects (such as geography, arithmetic, composition, and dictation), while some of the senior boys have taken up, with marked interest, elementary practical geometry and surveying. In addition to the work in the school-room, each boy receives daily training in raising the crops under cultivation and in the care of



the live stock attached to the school; for it is realized that this practical work, to which about three and a half hours are given daily, is of very considerable importance in affording a valuable education to the pupils of the school.

This practical training consists of the ordinary field work connected with the cultivation of the staple crops of the island, and of such specialized work as budding and grafting. The raising of budded and grafted plants for distribution has become an important part of the practical work of the agricultural schools at Dominica and St. Lucia, and this training, as stated in the last number of the *Agricultural News* (p. 114), is likely to be appreciated by planters, who will be able to obtain the services of youths skilled in the processes of budding and grafting. The interest shown by the pupils of the St. Vincent school in the cultivation and preparation for export of Sea Island cotton is sure to secure recognition by cotton planters who are desirous of obtaining overseers or assistants with a knowledge of the needs of this crop.

At each school, a portion of the land is divided into experiment plots for testing varieties of different plants, introduction of new plants of economic importance, controlling insect pests and fungoid diseases by insecticides and fungicides, etc. This stimulates the spirit of inquiry amongst the pupils, and teaches them the value of a discriminating use of the results of careful experiments.

Further, where land is available, it is being brought into cultivation as fast as time and expense will allow, with the view of working it on commercial lines, in this way making the school of immediate practical value. In Dominica, much of the land is being planted with permanent crops, with the intention of rendering the school partially self-supporting; while in St. Lucia an increased area is to be placed under cultivation for the production of vegetable food stuffs for use in the public institutions, thereby reducing their cost of upkeep, and affording useful object-lessons to the pupils and to the general public.

The care and management of stock is a part of the routine work of the school. This affords practical instruction as to what is required for keeping them in a healthy condition, and gives the pupils an opportunity of learning something of the maladies of each and their treatment. Rabbit breeding is taken up, and pure-bred Belgian hares have been introduced in order to improve the local stock. Poultry raising also receives attention, and now, by the use of incubators,

a good supply of well-bred chickens is from time to time available for disposal throughout the different islands. In St. Vincent much of the work of the Stock Farm is carried out by the pupils of the Agricultural School.

With a view to keeping the interests of the boys centred on their work, land is apportioned off to each for a small garden, in which they are allowed to grow any crop they wish during their hours for recreation, and to dispose of the produce. English vegetables are the crops chiefly grown, the seeds being supplied gratis; but it is of interest to note that in Dominica the boys devote much of their private time to the budding of oranges, some having made as much as 24s. pocket money from this source.

The provision of abundant material for every scholar to handle for himself gives opportunity for carrying on education by experiment, rendering possible the verification of important facts by observation and direct instruction. In this way the work of the schools is as practical as possible. The pupils become intimately acquainted with all the details of work in the field before the theoretical knowledge of science necessary for keeping abreast with agricultural progress is learned; for the blending of practical experience with theoretical knowledge is the most desirable method of producing young men qualified to take up responsible positions on estates.

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## PLANT DISEASES IN CALIFORNIA.

The report of Mr. Ralph E. Smith, B.Sc., Plant Pathologist to the California Agricultural Experiment Station, contains some interesting information in reference to investigations carried out with the fungus diseases of plants prevalent in that state.

A bacterial disease of tomatos, called the Blossom-end Rot, has proved to be of a serious nature, and it would appear to be similar to a disease that has been noticed in St. Lucia (*Agricultural News*, Vol. V, p. 151).

Information is given of inquiries into the diseases affecting citrus trees, from which it is gathered that a 'gum disease' occasions large losses in lemons, and also attacks orange trees. The disease can be recognized by the exudations of gum from the trunk, and appears to be prevalent on trees in poorly drained situations or otherwise under unfavourable conditions.

The gum breaks out through the bark, the cambium and inner bark become disorganized, and in severe cases the tree dies. Other less severe cases recover, or are helped by cleaning out the affected bark and painting over the wound with an antiseptic.

The work of investigating citrus diseases is now being thoroughly undertaken, and with the founding of a laboratory for southern California, an opportunity will be afforded for vigorously prosecuting what has long been a pressing need in that section.



## SUGAR INDUSTRY.

### The Antigua Sugar Factory.

The following is extracted from the second annual report of the Directors of the Antigua Sugar Factory, Ltd.:—

The prolonged drought referred to in the last report became intensified during the present year, and has proved more severe than any experienced in the island for the last thirty years. Happily, it has now broken. There has been abundant rain, and the prospects for the coming year are decidedly hopeful. The scarcity of rain not only injuriously affected the canes, but left the factory without sufficient water for the proper maceration of the canes in the mill, so that the yield of sugar has been 9·52 per cent. only, as against 10·31 per cent. in 1905. The market value of sugar has also been much below that of last year.

The quantity of canes brought to the factory was still considerably short of the normal quantity, though much larger than in the previous year, this being due partly to a better appreciation of the advantages offered and partly to increased facilities in the shape of railway extension. Owing to this shortness of supply and to the other causes mentioned above, the profit and loss account, after charging the expenses of the year, and £2,000 as stipulated by way of sinking fund, leaves only a small surplus of £331 17s. 10d., which is payable and has been credited to the 'contracting planters,' under the terms of the agreement with them.

In addition to the facts stated in the above extracts from the Directors' report, the following details, furnished by Dr. Watts, concerning the working of the factory, will be of interest:—

Canes crushed, tons	—	—	24,425·6
Sugar made, 1st, „	—	—	2,296·1
„ „ 2nd, „	—	—	52·4
Total „	—	—	2,348·5
Tons of cane per ton of sugar	—	—	10·44
'Indicated' sucrose in juice, tons	—	—	2,788·4
Recovery on 'indicated' sugar	—	—	84·2
Water in megass, per cent.	—	—	49·9
Normal juice lost in megass per 100 of fibre—	—	—	103·2
Average composition of:—			
First mill juice	Total solids	—	20·10
	Sucrose	—	18·33
	Purity	—	91·2
Total juice, including maceration water	Total solids	—	18·43
	Sucrose	—	16·31
	Purity	—	88·5
Molasses, gallons	—	—	109,900
„ for ton sugar, gallons	—	—	46·8
Fuel, cords	—	—	12·5
„ coal for locomotive and workshop	—	—	53·0
Number of days working	—	—	113

Owing to deficiency of water from the severe drought, the amount of maceration water used was insufficient; the work of the mills was, therefore, not as good as it should be when an adequate supply of maceration water is available.

It is satisfactory to note that the mills have now been greatly improved by the addition of a Krajewski cane crusher, which is doing excellent work; further, the supply of maceration water now being adequate, the milling work during the next season should be greatly improved.

### Sugar Industry in the Leeward Islands.

The following is extracted from the *Annual Colonial Report* on the Leeward Islands for 1905-6:—

This constitutes the principal industry of Antigua and St. Kitt's; in Nevis and Montserrat the industry is in a decadent condition. In Antigua, owing to drought, the crop was small; St. Kitt's was not, however, so severely affected. The average annual export of sugar of Antigua and St. Kitt's is about the same.

In Antigua the central factories at Gunthorpe's and Bendal's have continued operations. These institutions are bound by the contract under which they received Imperial grants to assist in their construction, to purchase, if tendered, peasants' canes to the amount of 1,500 tons per annum in the case of Bendal's, and 4,000 tons per annum in the case of Gunthorpe's. The prices paid vary on a sliding scale with the market price of grey crystal sugar, and in no case can it fall below 7s. 6d. per ton of cane. The effect of this has been considerably to increase the area cultivated by peasant farmers.

Experimental cultivation of sugar-cane has been continued under the auspices of the Imperial Department of Agriculture in Antigua and St. Kitt's. The object of these experiments is to ascertain, by cultivation of a number of varieties of seedling canes, which canes are most likely to produce increases in the yield of sugar per acre, and at the same time are most resistant to disease. The effect of these experiments has been to eradicate cane disease in the Leeward Islands to a large extent. Manurial experiments are also conducted with a view to ascertain the manurial requirements of the sugar-cane. In all there are ten sugar experiment stations in Antigua, and nine in St. Kitt's; the results obtained are followed with keen interest by planters.

### Seedling Canes in Louisiana.

The following is extracted from the report on the Louisiana Agricultural Experiment Stations for 1906:—

The D. 74 and D. 95 seedling canes have again maintained their superiority over the home canes, not only on the stations, but throughout the state, the result being a large extension of the area planted in these canes this year. This applies particularly to the D. 74, which is highly commended by practically all planters. An extended report was made to the Sugar Planters' Association and published in the *Louisiana Planter* (and will later be published in bulletin form) on the results from these two seedlings compared with home canes during this year, which was favourable in every instance to the new canes, both from a field and sugar house standpoint. At the station here the D. 74 showed itself markedly superior to either the home or D. 95, the tonnage being greater and the sugar content very much greater than the home cane, and markedly greater than the D. 95, which is richer in sugar than the home cane.

New seedling varieties were introduced this year from Jamaica, Java, and Barbados, and they have now been placed in our regular variety plots to compare them with other canes. We have also secured from the Hawaiian Islands a quantity of cane seed, and have, for the first time, successfully germinated these seeds in Louisiana, and we have now Louisiana seedlings which are ready to be placed in the field. In December we received another consignment of cane seed from the Hawaiian Islands. These have been planted and have germinated remarkably well, and we have every hope from this germination to secure a number of seedlings from these plantings. There are prospects that some of these will develop into very desirable canes for Louisiana.



## CANADIAN TRADE DELEGATION.

The delegates from the Boards of Trade of Toronto, St. John, and Halifax, who visited the West Indies recently to ascertain in what respects the business between Canada and these colonies was capable of being more fully developed, have returned to Canada and have reported 'a very cordial desire on the part of the merchants in the West Indies to give Canada as large a share of their business as possible.'

In reference to the suggestion that the British West Indies might encourage the importation of goods from Canada by means of a preferential tariff, the Secretary of the Halifax Board of Trade addressed a memorial to the Prime Minister of the Dominion. The following is an extract from this memorial :—

It is felt that, if Canadian goods were granted a preference in the British West Indies, it would be of very great advantage to this country, and would enable a large trade to be done in agricultural products, such as flour, oats, peas, etc., which are now sent there from the United States.

My board has therefore considered the question of sufficient importance to warrant its being brought to your attention on the eve of your departure to London, to attend the conference of colonial premiers, presuming that the general principle of preference within the empire is likely to be one of the subjects to be discussed.

May I, therefore, on behalf of the Halifax Board of Trade, ask that, in considering this question, you will bear in mind how much the admittance of British goods into the markets of the West Indies at lower rates than those charged by foreign nations would tend to increase the exports of Canadian agricultural products.

Commenting on the report of the delegate from the St. John Board of Trade, the *Sun* (St. John, N.B.), of April 3, says :—

The report delivered to the St. John Board of Trade yesterday by Mr. H. B. Schofield on behalf of the Canadian trade delegation, recently returned from a comprehensive tour of the West Indies, is a document of great value to the merchants and manufacturers of this country. Not only does it clearly show what large openings for trade expansion exist in this direction, but it also points out the course of action calculated to take the best advantage of those openings. It is clear that Canada has heretofore neglected rich opportunities in these islands, and that other countries, notably the United States, have obtained a strong foothold there ; but it is also clear that it is not too late yet for Canadian merchants, by energetic action, to regain the lost ground, and to establish trade connexions immensely profitable. With a better appreciation of the class and quality of Canadian goods which will sell best in the West Indies, with the establishment of better transportation arrangements and a system of cold storage, and, most important of all, with a system of reciprocal tariff preferences, there is no room for doubt that a great and permanent trade can be built up.

The suggestion that Sir Wilfrid Laurier be urged to draw the attention of the Colonial Conference to the need for a preferential system between these two portions of the empire is wise, and will probably be acted upon. Any negotiations in this regard must be carried on through the medium of the Colonial Office, and, since the delegation reports that the present time is most opportune, they should be begun without delay.

The following is an extract from a letter addressed to the Imperial Commissioner of Agriculture by Messrs. Pickford & Black, of Halifax :—

The sending of the delegates to the West Indies has been of great interest to you.

They have all returned and made their reports to the different Boards of Trade, and we have no doubt that the delegation will result in increased trade between Canada and the West Indies. The effect will not be felt at the moment, but in a year or so we hope a marked increase in the trade will be noticed.

We thank you very much for the very great interest you have taken in it. All the delegates speak in the highest terms of your assistance and the keen interest you took. The only thing we regret is the shortness of the time the delegates had at such places as Demerara, Trinidad, and Barbados.

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## TROPICAL HYGIENE.

The late principal medical officer at Sierra Leone gave an address on 'Health and Sanitation on the West Coast of Africa,' before the Liverpool Chamber of Commerce, on February 4, 1907. He pointed out that, 'new weapons have been forged which have enabled us to deal drastically with tropical diseases, which have diminished, to some extent, the risks of residence in West Africa, and which will, in time, remove from the coast the unenviable reputation which it now bears.'

The use of the mosquito net has now become much more universal, and its value more appreciated. In certain unhealthy spots, mosquito-proof rooms or mosquito-proof houses have been found to cause much improvement in health. The continuous use of quinine in malarial districts has been proved to be a most efficient preventive of malaria.

It is also advisable that European clerks in stores in towns like Freetown, with very many unsanitary native houses, should not continue the custom of living night and day in the business premises, but should live away from their work outside the ill-odoured town.

Proper surface drainage and the prevention of collections of water in which mosquitos might breed will be followed by considerable improvement in health. Also, the younger generation of the natives should be educated in their schools or elsewhere in the elements of tropical hygiene. 'It will be many years before West Africa as a whole can be made healthy, . . . but I look forward to the time, and that at no distant date, when a visit to West Africa will be regarded in the same light as one to any other of our tropical dependencies.'

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**Guinea Yam.** Mention was made in the *Agricultural News*, Vol. IV, p. 332, of the Guinea yam grown at Tobago. Plants of this yam were obtained from Tobago last year and planted at the Agricultural School at Dominica. The Officer-in-charge writes as follows : 'This yam is in every respect similar to the Dominica Guinea yam, and I believe it to be the same variety. This is not the only variety of yam that will produce a second crop for planting purposes, if the vine, with a small heel, be allowed to remain in the soil after removing the tubers. The "yellow" yam and "silk" yam can be treated in the same way.'





## WEST INDIAN FRUIT.

### THE MANGO.

The mango (*Mangifera indica*) is an East Indian tree which has been cultivated for its fruits in India for thousands of years. It is related to the cashew, hog-plum, and golden apple, belonging to the natural order *Anacardiaceae*.



FIG. 12. FRUITS OF MANGO.  
(From *The Book of Trinidad*.)

The mango forms a shapely tree, 30 feet or more high, having long, dark-green, lanceolate leaves, with hinged stalks,

pink young foliage; large, upright, terminal panicles of yellowish, polygamous flowers, and yellow, red-cheeked, or green fruits hanging at the ends of thin branches. The small flowers have usually only one functional stamen, and seem to be attractive to bees. As a rule, only a few flowers on each panicle develop into fruits. The fruit may weigh from 6 oz. to 2 lb. Its thin, tough skin, surrounds an orange-coloured, sugary, juicy, sometimes resinous pulp, which, in some kinds, has a flavour reminding a European somewhat of parsnips. The stone, which is fibrous and wrinkled, splits readily into two halves, and contains a large seed, occasionally provided with several embryos. The mango varies much when grown from seed. If the poor kinds are not cut down for fire-wood, as has been done in India for centuries, but are allowed to produce self-sown seedlings, there will result a race of tow-and-turpentine mangos. Seeds from the good varieties (of which more than a hundred are cultivated in the East Indies) will often produce trees bearing good fruit. An Indian propagator of extensive experience says that with seedlings of good kinds about half will be equal to the parent, 1 or 2 per cent. may be better, and the rest will be worse. But the mango can be easily propagated by budding or approach grafting. By these methods a uniform orchard of choice mangos can be produced. Grafted trees are usually somewhat dwarfed (which is no disadvantage), and they produce fruit sooner than seedlings. If a mango does not fruit (in consequence, perhaps, of too much rain), it may often be induced to do so by digging a trench round the stem, and pruning the small roots. In India the mango season is prolonged by the growth of early, medium, and late-ripening varieties of mango.

Fig. 12 shows fruiting branches of mango.

### NEEDLE AND DAGGER PLANTS.

The name 'Spanish Needle' is applied in Barbados, and apparently also in Antigua, to the common liliaceous plant, *Yucca aloifolia*.

In Jamaica (*Agricultural News*, Vol. II, p. 409) this name is used for a composite plant, a bur-marigold (*Bidens leucantha*), which is used for feeding purposes. It is reported to be a splendid food for horses out of condition. The name 'Adam's needle' is used for *Yucca aloifolia* in Antigua and other West India Islands, and for *Yucca filamentosa* in the United States. The term 'dagger plant' is sometimes applied to *Yucca aloifolia* in the West Indies, to *Agave americana*, and also to *Furcraea cubensis*.

In St. Croix and St. Kitt's, species of *Agave* and *Furcraea* are usually called 'karata' or 'corita.'





### WEST INDIAN COTTON.

Messrs. Wolstenholme & Holland, of Liverpool, write as follows, under date of April 8, in regard to sales of West Indian Sea Island cotton:—

West Indian Sea Island cottons have been in good demand during the past fortnight, both for home and foreign spinners, and prices are very steady.

The sales reach about 400 bales, and comprise: Barbados, 24*d.* to 25*d.*; Montserrat, 22*d.* to 24*d.*; Nevis, 21*d.* to 24*d.* (the latter being the best we have seen from this island); Antigua, 24*d.* to 29*d.*; Anguilla, 19*d.* to 23*d.*; and St. Vincent, 21*d.* to 29*d.*

Spinners hold fair stocks and, of course, are indisposed to carry into next season any of this high-priced cotton. We are therefore in favour of as prompt sales as possible at anything like these figures. The demand runs from 22*d.* to 24*d.*, and to obtain above the latter figure the cotton must be superfine, in which case spinners are indifferent about price, as the quantity of such cotton to be obtained is so small.

### ST. VINCENT COTTON FACTORY.

The following is taken from the *St. Vincent Times*, of April 11:—

A conference of the leading cotton growers was held at the Court House yesterday for the purpose of considering suggestions for the taking over of the Central Cotton Factory. After some discussion, during which a company was formed, the following decisions were arrived at:—

(1) That the sum of £1,250 be offered for the factory, the purchase to include surrounding lands.

(2) That the amount of £2,500 be raised in 500 £5 shares for the working of the factory.

Most of these shares were taken up; fifty were allotted to peasants; of these twenty-eight were taken by small growers present. At the present time it is almost impossible to find peasant proprietors in the position to buy shares at £5; it is very likely, therefore, that peasants will be excluded from the company.

### ST. VINCENT COTTON INDUSTRY.

The following is extracted from a letter, dated April 13, addressed by the Agricultural Superintendent in St. Vincent to the Imperial Commissioner of Agriculture:—

To date, 221,735 lb. of lint, or nearly 616 bales, have been ginned at the Central Cotton Factory, and there is yet a good lot of ginning to be done. For white cotton, the percentage weight of lint to seed-cotton has, so far, varied

from 26 per cent. to 30 per cent.; the average being just over 27 per cent. For stained, the percentage works out at about 25 per cent.

A meeting of cotton growers was held at the Court House on Wednesday, April 10, to endeavour to form a company to take over the factory from the Government.

I learn that a company was formed for the purpose. The company will endeavour to raise the sum of £2,500 in 500 £5 shares, and offer £1,250 for the building and land, and part of the old estate building near by.

Nearly all the shares were allotted at the meeting. A few were reserved for small growers.

### COTTON INDUSTRY IN THE LEEWARD ISLANDS.

The following is extracted from the *Annual Colonial Report* on the Leeward Islands for 1905-6 (dated December 27, 1906):—

The extension of the cultivation of Sea Island cotton has been very marked in the Leeward Islands during the past four years. It is estimated that for the coming crop 1,800 acres are under cultivation in Antigua, 1,100 in Montserrat, and 4,000 in St. Kitt's-Nevis and Anguilla. In the Virgin Islands the cultivation of cotton is gradually being extended. In Dominica its cultivation has made practically no headway, it being found that the climatic conditions are unsuitable to its successful growth.

In Nevis and Montserrat it would appear that cotton is gradually taking the place of cane as the staple crop of these islands.

The extension of the cultivation of the crop has been largely assisted by the British Cotton-growing Association, which has done much, in the way of providing money, machinery, and advice, for the advancement of the industry.

The efforts of the Association have been largely directed through the Imperial Department of Agriculture.

### COTTON CULTIVATION AND LABOUR.

In cotton cultivation the labour question is of very great importance, and should always be carefully considered before putting more land in cotton or commencing cotton growing in a new district.

It is possible to do much of the work on a cotton estate with the plough and the cultivator, but there are some things which must be done by hand. Paris green cannot be applied at present except by hand, and no satisfactory cotton-picking machine has been invented.

To obtain sufficient labour to pick the cotton has, in some instances, been a great difficulty, although no serious





inconvenience was experienced in preparing the land and getting the crop ready to be picked.

Where the land is forked, men must be employed to do that work; the weeding is done by young people (boys and girls); Paris green is usually applied by boys, and picking is done by women, boys, and girls.

The labour question should be very carefully considered before planting cotton in any new district; it is advisable to proceed cautiously and to cultivate a small acreage well, rather than venture on a large acreage with insufficient labour. The latter course is never satisfactory to manager or owner, while the former almost always leads to success.

### FUNGUS DISEASES OF COTTON.

The fungus diseases prevalent amongst cotton cultivations in British Guiana have been the subject of investigation by Mr. A. W. Bartlett, B.A., B.Sc., F.L.S., Government Botanist, and the report that embodies the result of his inquiries has been published in the *Official Gazette*, of March 13, 1907.

It would appear from the report that three fungoid diseases of cotton are present in the cotton cultivations of British Guiana, viz., (1) 'anthracnose,' (2) a 'boll rot,' and (3) 'rust'

'Anthracnose' is caused by a parasitic fungus (*Colletotrichum gossypii*, Lager.) that attacks the bolls. It would appear that in British Guiana it may affect mature stems, the varieties of Caravonica cotton having suffered particularly from this latter form of attack. It is pointed out that the fungus causing this disease would seem to be more nearly related to the American variety which causes a similar disease in the cotton-growing districts of the United States than to the West Indian variety; but it is likely that the remedial measures advocated by the Imperial Department of Agriculture (*Agricultural News*, Vol. V, pp. 109, 119, and 182) should keep the disease of the bolls in check. It is suggested in the report that the disease of the stems may be stopped by the application of Bordeaux mixture 'either by means of a hand sprayer or brush.'

The 'boll-rot' resembles closely a similar disease investigated by Mr. L. Lewton-Brain, B.A., F.L.S., (formerly Mycologist on the staff of this Department) in Montserrat. The contents of the bolls are involved in a rot, of which there is little, if any, external evidence. Sometimes, however, the bracts of diseased bolls become partially wilted. The disease in British Guiana is held to be due to a fungus that has not as yet been identified; while in diseased bolls from Montserrat, no fungus was discovered to which the disease might be attributed, but short, rod-like, non-motile bacilli were constantly present.

It is said to be very destructive, and every effort should be made towards procuring a disease-resistant variety of cotton; as a means of helping the planters to overcome difficulties that tend in any way to impede the success of the cultivation of cotton in British Guiana through the presence of this disease.

'Rust' makes its appearance as reddish pustules on the leaves and is widely spread, but does not appear to do much damage, as its attacks are mainly confined to the older leaves.

### WORLD'S PRODUCTION OF RUBBER.

In the *Tropenpflanzer*, for February 1907, Professor Warburg discusses the production of rubber throughout the world. The following is an abstract:—

The total production of rubber has risen fairly steadily from about 53,400 tons in 1889-90 to 68,000 tons in 1905-6, and the consumption has more than kept pace with the supply.

Much more than half of the total world's production of 1905-6 was due to America, namely, about 42,800 tons. Nearly all of this originated in Brazil, which produced 41,000 tons, including rubber exported along the Amazon from Bolivia and Peru. Other South American States total about 1,200 tons of rubber; Bolivia producing 1,100 tons, the greater part of which, however, was exported through Brazil. Central America exported about 400 tons, of which Nicaragua produced 250 tons, Costa Rica 70 tons, Guatemala 60 tons, Panama 15 tons, and Honduras 5 tons. Mexico's rubber production amounted to no more than 150 to 200 tons.

The export of rubber from the Amazon region increased regularly from 22,216 tons in 1896-7 to 34,852 tons in 1905-6, of which last amount 20,167 tons went to Europe and 14,685 tons to America. Besides this, Brazil exported in the year last mentioned 4,800 tons of Ceara rubber, and about 3,000 tons Mangabeira. The prospects of Guayule rubber in Mexico seem poor, and those of the mistletoe rubber of Venezuela even less prosperous. The Para rubber production of Brazil is increasing at the rate of about 5 per cent. yearly, while the production of Ceara and Mangabeira rubbers has more than doubled in the last five years. The Castilloa rubber production of Mexico and Central America does not yet seem to be increasing.

Of the 23,400 tons of rubber produced in Africa, 4,500 tons came from the Congo Free State, 1,500 tons from French Guinea, 1,250 tons from Angola, 1,000 tons from the Gold Coast, while all the other colonies exported together less than 1,000 tons.

The total production of rubber in Asia (and Polynesia) in the year 1905-6 was only 1,800 tons. Ceylon was responsible for about 200 tons of this; India, Burma, and the Malay Peninsula for about 300 tons each, the rest being produced mostly from the French colonies and the Malay archipelago. Ceylon exported only 84 tons of plantation Para rubber, but next year, double this amount will be forthcoming, and the production will go on increasing.

It may be estimated that in ten years the present plantations of Para rubber in Ceylon, Malaya, and other regions will produce 25,000 tons of Para rubber annually; also, presuming that in the future there is a yearly increase of plantations of Para rubber of 10 per cent., and that the Brazilian Para supply continues to increase at the rate of 5 per cent. per annum, there will be a yearly increase in the production of Para rubber of only about 10 per cent. The production of Ceara rubber may be greatly increased in Brazil, and the plantations of this rubber in East Africa may be much extended. The production of Castilloa rubber in Mexico and Central America can only be increased slowly, especially on account of the labour difficulties. The production of Funtumia rubber in Africa may well be greatly extended, whilst that of the wild rubber can hardly increase much on account of the destruction of most wild rubber vines and trees, despite orders to the contrary. Asia and Africa, especially the former, have a great advantage over America in the production of rubber by reason of their cheap and good labour supply. So we may expect to see Asia, instead of America, leading the future world's market in rubber production, whilst Africa will probably retain the second place.



## EDITORIAL NOTICES.

Letters and matter for publication, as well as all specimens for naming, should be addressed to the Commissioner, Imperial Department of Agriculture, Barbados.

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# Agricultural News

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VOL. VI. SATURDAY, MAY 4, 1907. No. 131.

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## NOTES AND COMMENTS.

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### Contents of Present Issue.

The editorial (pp. 129-30) contains a general account of the Agricultural Schools established by the Imperial Department of Agriculture at St. Vincent, St. Lucia, and Dominica.

A review of the work at the Antigua Central Sugar Factory during 1906 appears on p. 131.

References will be found on p. 132 to the report of the Canadian Trade Delegation which recently visited the West Indies.

Cotton growers will find several notes of interest on pp. 134-5.

Observations have been made at Antigua on the results of introducing Barbados 'millions' into mosquito-infested ponds (p. 138).

The recent Agricultural Show at Nevis was an unprecedented success (p. 139).

An interesting review of the world's production of rice will be found on p. 141.

The attention of owners of horses is invited to the description of the horse's foot (p. 142).

A number of pedigree animals, the property of the Imperial Department of Agriculture, are offered for sale (p. 143).

### Citrate of Lime in Sicily.

In continuation of his report on the citrate of lime industry in Sicily, published in the *Agricultural News*, Vol. VI, p. 83, His Majesty's Consul at Palermo has written to the Secretary of State for Foreign Affairs that he has been making further inquiry in the matter with the result that one important point should be rectified. 'The degree of heat to which the raw juice should be heated whilst being mixed with lime should be 60° C. I am informed that greater heat will produce still better results.'

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### Date Palm in Australia.

In the *Agricultural Gazette* of New South Wales, for February 2, 1907, there is a paper by the Government Entomologist on the date palm. The palms at Pera Bore, where there is a good supply of artesian water, were obtained fourteen years ago in pots from Algeria by the Agricultural Department. These date palms have flourished and grown into fine shade trees and have produced good marketable dates.

Date palms may be grown in the future in large numbers at the many artesian bores extending over a large area of central Australia. It is easy to transport the suckers from Arabia or Africa, if they are carefully packed in bundles. When they are established, suckers can be obtained from the young palms, so that a small grove can soon be extended.

The date palm grows remarkably well in some West India Islands, where there is a deep, porous soil and not too much rain. One staminate palm may be made to fertilize 100 of the fruit-bearing individuals. As it does not come true from seed, the best kinds should be propagated only by suckers.

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### Cotton in Northern Nigeria.

In the *Annual Colonial Report* on Northern Nigeria for 1905-6, Sir F. Lugard describes the cotton prospects of that extensive region.

The British Cotton-growing Association have decided after lengthy investigation, that Northern Nigeria is the most suitable of the British colonies to provide the millions of bales of cotton required in England. Sir F. Lugard considers their estimate as rather optimistic, on account of the population being too sparse for so large an industry, except in the Kano Emirate. A surface tramway is recommended as a means of conveying the cotton from the districts of Zaria and Kano to the waterways. The Association has made an agreement with the Niger Company by which the latter acts as purchasing agent for the Association, which manages the ginning plant.

The total quantity of cotton exported during 1905-6 was only equal to about 26 tons of lint. Since February 1906, 70 tons were exported in three months, as a consequence of the completion of the agreement above alluded to. The prices paid to the natives are  $\frac{3}{4}$ d. per lb. for seed-cotton, and 3d. to 3½d. for lint. They are extending their cultivation of cotton. American cottons do not seem so well suited to the climate, and produce lint inferior to that of the best local varieties.



### Agriculture in Liberia.

According to the *Consular Report* on Liberia for 1906, there are only about 10,000 Americo-Liberians settled on the littoral regions. Agriculture seems neglected by them.

'The rice grown in the interior by the aboriginal tribes is of splendid quality and full of nourishment. The grain is somewhat coarse and is not as pure white as the imported article, but it is a food which produces stamina and muscle, and is eminently adapted as an article of diet to the climate and country in which it is grown. The systematic cultivation of the indigenous rice should be a profitable undertaking, because in the neighbouring colonies and protectorates large quantities of this commodity are imported, and there is a constant demand for rice on the coast.'

Palm kernels and oil are exported. The coffee industry has fallen off considerably, insufficient attention being given to its cultivation. Raffia fibre, kola, copal, and some ginger are also exported. The quality of Liberian cotton, even in its wild state, is sufficiently good to indicate what might be achieved by systematic cultivation.

It is regarded as possible that, when the flora of the unexplored forest regions becomes better known, some of the indigenous herbs and roots may prove of value to Europeans resident in West Africa. There are a large number of well-known fruits in the country.

### American Breeders' Association.

This association was organized in 1904 to 'study the laws of breeding, and to promote the improvement of plants and animals by the development of expert methods of breeding.'

It has taken up the subject in a systematic manner, and a large number of general problems that require continuous study have been assigned to distinct committees including some of the foremost investigators in the United States. The publication of the proceedings of the annual meeting is always looked for with interest by all those connected in any way with breeding work, for they always abound in facts and information of considerable value.

A summary of the reports of committees, addresses, and papers presented at the January meeting, 1907, given in the *Experiment Station Record*, for March, shows that marked progress has been made along certain lines in animal and in plant breeding.

The improvement of the sugar-cane by selection and breeding was discussed, and it was noted that improvement by seminal variation had so far given the most satisfactory results, as much progress had been made in this direction toward increasing the yield of cane per acre and the sugar content, securing disease-resistant varieties, and developing varieties suited to different soil and climatic conditions.

It is also of interest to note that hopes are entertained of increasing the available sugar in sugar beets grown in the United States by at least 2 per cent. through the use of pedigree strains of seed.

### Coagulation of Para Latex.

The following information on the coagulation of the latex from Para rubber trees is abstracted from the lectures on the subject delivered at the Ceylon Rubber Exhibition:—

Fresh latex is nearly neutral or slightly alkaline. When acidified, coagulation takes place throughout the latex, whilst the rubber slowly contracts and rises to the surface as a white mass. When washed, pressed, and dried, it contains 95 to 96 per cent. of caoutchouc, and has a specific gravity of .92 to .96. When fresh latex is allowed to ferment, bacterial decomposition produces acids which bring about its coagulation. If formalin is added in sufficient quantity, its antiseptic properties prevent fermentation. In this case the latex may be kept at least some weeks without coagulating or spoiling. If sufficient ammonia is added to fresh latex, it neutralizes the acids produced during decomposition, and the latex can be kept without coagulating, but possibly some chemical changes may take place. Samples of latex preserved for two months in London by means of formalin, coagulated directly an acid was added and produced excellent biscuits. The only perceptible chemical change in the latex was a slight generation of sulphuretted hydrogen.

### Agricultural Progress in the Leeward Islands.

In the *Annual Colonial Report* on the Leeward Islands for 1905-6, it is stated that sugar growing is the principal industry of Antigua and St. Kitt's. The conditions of this industry are referred to on p. 131. The extension of the cultivation of Sea Island cotton has been very marked in the Leeward Islands during the past four years. In Nevis and Montserrat it would appear that cotton is gradually taking the place of cane as the staple crop.

The lime industry is now firmly re-established in Montserrat; in Dominica it continues to advance. In Dominica the cacao industry continues to make solid progress, and for some years it has been the principal export of the island. The experiments conducted by the Imperial Department of Agriculture with the object of ascertaining the effect of various manures and different methods of cultivation are followed with considerable interest by planters. There is a considerable export trade in fresh fruit from Dominica, particularly in limes and oranges.

The experimental cultivation of tobacco continues to be pursued in St. Kitt's. The results point to the possibility of eventually establishing a cigar tobacco industry in that island. The cultivation of *Castilloa* rubber is being experimentally extended in all the islands.

Botanic and Experiment Stations are maintained in every presidency, at which are conducted experiments with plants with the object of improving agricultural conditions by the introduction of superior varieties of existing crops, and also of introducing new plants with a view to the establishment of fresh industries.

'In all the foregoing developments and efforts at advancement the Imperial Department of Agriculture has played a leading part.'





## INSECT NOTES.

### Millions and Mosquito Larvae.

Mr. Austin H. Kirby, B. A., Agricultural and Science Master at Antigua, has forwarded the following notes:—

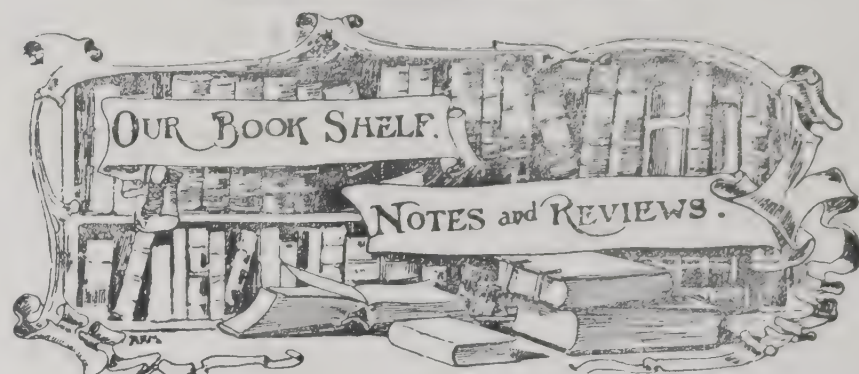
In the *Agricultural News*, Vol. IV, pp. 127, 138, 140, and 366, information was given respecting the small Barbados fish 'Millions' (described as *Girardinus versicolor* or a closely related species), especially in regard to its habit of feeding on the larvae of mosquitos, and it is there stated that some had been sent by the Imperial Commissioner of Agriculture to Antigua and St. Kitt's.

As those introduced in this way into Antigua thrived well, and when their numbers had increased sufficiently, were placed in several of the ponds in the island, where conditions were evidently favourable to them, it was thought expedient to seek knowledge in regard to their behaviour toward mosquito larvae which would corroborate, or possibly amplify, the statements previously made in this connexion. For this purpose, a few of the fish were placed, at the beginning of December last, in a tayche in which water is stored for use in the school garden at the Grammar School. This water had always swarmed with the larvae of *Culex* and *Stegomyia*, unless the precaution was taken to keep it covered with kerosene; in fact, these could be obtained from it at any time of the year by simply neglecting that precaution for a short while. Soon after the introduction of the 'millions,' however, no larvae could be found, and this has been the case for three months, the most careful examination failing to disclose them at any time during this period. This speaks well for the efficacy of the fish in regard to the destruction of the larvae of *Culex* and *Stegomyia*, at any rate. Those of *Anopheles* have never been found in the tayche, so that nothing definite can be said in connexion with them. It is very unlikely, however, that any discrimination between the different kinds of larvae is exercised; certainly, those of the two first-mentioned genera appear to be devoured with equal avidity. Observations showed that when 'millions' are placed in water already containing larvae, the small ones are attacked and eaten first. In all cases, the whole of the larva is devoured, being gradually taken into the mouth while the fish remains stationary.

The fact that water in which this fish is living remains free from mosquito larvae is due mostly, if not entirely, to the way in which it feeds, and not to what it feeds on. It vigorously attacks small insects that are drowning or resting on the surface, so that, although it has never been actually observed, it must inevitably be concluded that mosquitos attempting to lay eggs on the water are disturbed to such an extent as to prevent them from doing so where 'millions' are present; thus, no larvae can possibly develop.

The explanation given in the *Agricultural News* as to why *Culex* and *Stegomyia* are found in Barbados, while *Anopheles* is not, namely, that of the choice of breeding places, is supported by the experience of the writer. In Antigua, the larvae of the two first-mentioned genera are commonly found in tanks, cisterns, and other receptacles, where water

will remain for a time, while those of *Anopheles* have only been observed in shaded streams and ponds. This fact, coupled with the knowledge of the power of *Anopheles* to transmit malaria, goes far to explain the immunity from that disease of any island where the streams, etc., swarm with a larva-devouring fish.



**SCIENCE IN SUGAR PRODUCTION:** *An Introduction to the Methods of Chemical Control.* By T. H. P. Heriot. Altrincham, England: Norman Rodger. Price 6s. net.

An important aim of this book is to prove the utility of the trained chemist, so that the practical man may welcome him as a useful co-operator. As stated in the prefatory note: 'Although the sugar industry is abundantly provided with technical literature, no previous attempt has been made to bring the methods of science within easy reach of the practical sugar maker. This was undertaken in a series of articles on "Simple Methods of Chemical Control," which appeared in the *International Sugar Journal*, and are here brought together in a revised form.'

Notwithstanding all improvements of sugar machinery and the accumulated experience of centuries, some sugar is invariably lost in the process of manufacture. Some losses appear to be unavoidable; others are due to the continued use of inferior machinery or processes, and to ignorance or carelessness on the part of employees. How are these losses to be avoided? Mr. Heriot's book shows the advantages of chemical control.<sup>1</sup> The first requirement is the collection of the necessary data as to quantities of sugar contained in the various materials handled in the factory. Having an accurate knowledge of the weight of cane produced, the following data must be obtained: (i) the total weight of sugar entering the factory in the form of canes, (ii) the percentage recovered as crystallized produce, (iii) the percentage remaining in molasses and other by-products, and, finally, (iv) the losses occurring at different stages of manufacture. There are also additional matters connected with rum production, fuel, etc., in which chemical control is required. The work of the chemist in connexion with all the above points is fully explained.

The remaining portion of the three introductory chapters is concerned with explaining the rôle of the chemist in the sugar industry, and in showing that even without a chemist a certain amount of chemical control can be exercised by the intelligent worker.

Mr. Heriot then proceeds to discuss the 'practical methods of the chemist,' explaining the details of laboratory outfit, the preparation of a solution for analysis, the use of the hydrometer for testing the density of juice, and of the polariscope for estimating the percentage of sucrose in various materials.

The third and last part is entitled 'Simple Methods of Chemical Control,' the following being treated in separate chapters: the control of the mill, of the clarification, of the imports, of the exports, the detection of avoidable losses, and the control of the fuel.



## SCIENCE NOTES.

### Quassia or Bitter-wood.

The quassia wood of the British Pharmacopoeia is derived from the West Indian forest tree, *Picraena excelsa*.

This tree reaches the height of 50 feet and is fairly common on the plains and lower mountain slopes of Jamaica and other West India Islands. The large, alternate, compound leaves are crowded at the ends of the branches, and have nine to eleven stiff, shining leaflets, each 2 to 4 inches long. The small, polygamous, greenish flowers are in axillary panicles. There are minute sepals and petals, and four or five long stamens. There are three free ovaries with a trifid style. The fruit consists of three or fewer separate, globose, black drupes from  $\frac{1}{4}$  inch to  $\frac{1}{2}$  inch across, each enclosing one seed.

The yellowish wood is rather light, with plainly visible pores (often in groups), white rays, and concentric arcs of whitish soft tissue. This wood is intensely bitter, containing two crystalline bitter substances called picrosmins. A bitter tonic used in medicine is made from the chips. The decoction is also sometimes used to keep biting insects away from plants. The well-known 'bitter cups' of the West Indian curiosity shops are made from the wood. The old source of the drug quassia in Britain was the low South American tree, *Quassia amara*. Quassia from this source is still used on the continent of Europe.

### Effects of Poisons on Plant Roots.

The *Botanical Gazette*, January 1907, contains a paper by Mr. G. H. Jensen, setting forth the results of a detailed study of the effects of various poisons on the roots of wheat seedlings.

As copper and lead salts are often applied to plants to check the ravages of fungi or insects, a knowledge of their precise effects on the roots of green plants will be of value. The seedlings were grown in finely ground quartz with about 12 per cent. of moisture, or in a solution. The death point was taken as that concentration of poison at which the seedling turned yellow and died when its stored-up food was exhausted, viz., in five to ten days. It was found with copper sulphate that all the plants grown in solution died when the strength was  $\frac{1}{1000}$  of normal, and grew very badly in  $\frac{1}{20000}$  N. In the quartz the death point was between  $\frac{1}{100}$  N. and  $\frac{3}{100}$  N. At a strength of  $\frac{1}{2000}$  N., the growth was better than that without the poison. The seedlings, with this concentration of copper salt, transpired more, grew longer, and weighed more than without any copper. Similar results were obtained with lead nitrate, silver nitrate, zinc sulphate, nitrate of iron, and nickel nitrate, in all but two cases there being a stimulating effect in the solution as well as in the quartz soil. In the cases of phenol and ethyl alcohol, the quartz did not appreciably reduce the poisonous effect. Nickel was most poisonous in the quartz soil and silver in the solution, while ethyl alcohol was least poisonous.

### Polyembryony of the Orange.

In the *Agricultural News*, Vol. II, p. 374, it is explained that in the orange, besides the embryo which proceeds normally from the fertilized egg-cell, other embryos arise from the tissues of the nucellus. It is assumed that the occasional polyembryony of the mango is effected also in this way.

It is well known that one orange seed often produces several seedlings. The writer on one occasion found no less than eight, which were carefully separated and grown. If they, too, had been left together, the strongest growing one would doubtless have stifled the others. It is probable that only one of these embryos is the result of fertilization, and that the rest are developed asexually in the ovule. For, on hybridizing oranges, when the seedlings produced from one seed are separated and grown apart, it has been found that only one shows the effect of hybridization. Since the others are the result of asexual propagation, it is to be presumed that they might inherit all the qualities of their parent, just as if they had been propagated by budding. Hence it might be worth while, in growing good qualities of oranges from seed, to separate the seedlings from each seed and let each grow up. It seems not improbable that three-quarters or more of the orange trees so produced might be nearly exact replicas of their parents. If this is so, the fact that the orange has been grown from seed in the West Indies for some time without greater deterioration is partly accounted for. It would be of interest to know whether all of the two or more embryos which occasionally occur in the mango seed result from fertilization, or not.

### NEVIS AGRICULTURAL SHOW.

The following is an extract from a letter from the Hon. C. Arthur Shand, dated April 7, in reference to the Agricultural Show recently held at Nevis:—

You will be glad to hear that our postponed Agricultural Show, held on the 4th instant, was a most unprecedented success, as you will see from the enclosed list of entries. The shortage in fruits, flowers, and plants was due entirely to the drought, which had prevailed throughout the month of March, whilst the small number of exhibits in canes can be easily explained by the crop at present being so advanced that most of the canes have been already milled; but the exhibits in Class IV, Vegetables, were an immense surprise, as almost all of the exhibits were of exceptional merit and gave evidence of scientific cultivation on the part of exhibitors, who were chiefly peasant proprietors. One man who won the Administrator's prize for a mixed collection of vegetables had, in addition to growing, under adverse weather conditions, a most inviting assortment, including tomatoes, carrots, turnips, English potatoes, egg plants, and lettuces, manufactured a capitally constructed stand, fitted up nicely with trays, for the purpose of showing the exhibits to best advantage. I was so favourably impressed with his ingenuity and perseverance, that I at once put him down for one of the special Diplomas of Merit of the Imperial Department of Agriculture. The exhibit of live stock was also a revelation, as some of the horned animals, especially, would have won prizes almost anywhere.

The following is the list of entries referred to above:—

				Entries.
Class	I, Live Stock	—	—	167
"	II, Canes, etc.	—	—	14
"	III, Fruits	—	—	27
"	IV, Vegetables	—	—	71
"	V, Meals, etc.	—	—	53
"	VI, Industries	—	—	109
"	VII, Preserves	—	—	94
"	VIII, Plants and Flowers	—	—	27
"	IX, Miscellaneous	—	—	69
Total				631.





## GLEANINGS.

The Cuban sugar crop receipts to date are said to be the largest on record. The total received at the six ports is 245,000 tons more than last year, and 100,000 tons more than in 1905. (*International Sugar Journal*.)

The medal offered by the Trinidad Agricultural Society for the best all-round exhibits in connexion with the yearly schools' shows was presented to the Carenage Government School on April 19.

The death is announced of the distinguished Agricultural Chemist, Professor Robert Warington at Harpenden, on March 20. Professor Warington is best known as the author of the popular little text-book, *The Chemistry of the Farm*, which has passed through fifteen editions.

Onions continue to form an article of export from Antigua. In 1905, 1,078 crates were exported, valued at £233 18s. 10d. In the other islands their cultivation is being gradually extended. (*Annual Colonial Report on the Leeward Islands, 1905-6.*)

The wild cotton plant of the interior of Liberia (*Gossypium punctatum*) is used solely for the manufacture of native cloth. The Peruvian and Barbados cottons grow near the coast. The people would be likely to take up the cultivation of cotton if they were systematically taught. (*Consular Report on Liberia, 1906.*)

Hybrid oranges are being grown at the Sugar Experiment Station at Audubon Park, Louisiana, with the view of getting an edible orange that will withstand the coldest weather there without protection. These hybrids fruited to a large extent last year, though they, in common with other citrus trees, suffered from insect attacks.

About twenty-two species of vines, plants, and trees in the forests of Liberia produce rubber. The Liberian Rubber Corporation, founded in 1905, has been active in the collection of rubber. The collection of rubber as an employment seems to be increasingly popular among the natives. There seems every possibility of a large and valuable trade being developed in this product. (*Consular Report on Liberia, 1906.*)

Among the exports of vegetable products from Mexico during the year 1905-6, there was a marked increase in rubber, the value of which amounted to £167,132 more than in the previous year, Guayule also being credited with an increase of £11,702. The increase in the export of vanilla, amounting to £18,717, which last year showed an augmentation of 75 per cent., is also noteworthy. (*Consular Report.*)

The *Agricultural Journal* of the Royal Botanic Gardens, Ceylon, (Vol. III, no. 22), states that the cultivation of *Funtumia* rubber is rendered impracticable in Ceylon by the persistent attacks of a leaf-rolling caterpillar (*Caprinia conchylalis*), which, at regular periods of about three months, destroys every leaf of the young trees. The cost of arsenical spraying would render it unremunerative to grow this rubber.

It is mentioned in the *Annual Colonial Report* on the Cayman Islands that the green turtles display an extraordinary sense of locality. 'It has happened more than once that turtles marked with the initials of their captors have escaped from their crawls in Grand Cayman, and within three months have been re-captured at the fishing ground, a distance of over 300 miles.'

In Montserrat the lime industry is now firmly re-established. In Dominica the industry continues to advance; large shipments of raw and concentrated juice are now made, and there is also an appreciable export in green and pickled limes. The manufacture of citrate of lime in place of concentrated lime juice is now attracting attention, and shipments of this product from both Dominica and Montserrat have been made. (*Annual Colonial Report on the Leeward Islands, 1905-6.*)

The *Agricultural Gazette* of New South Wales, for January, notes that there were in 1906 about 52,000 hives of bees in the colony. For the last five years the average quantity produced was about 51 lb. of honey and rather more than 1 lb. of wax per hive, which, at average wholesale market rates (of a little over 2½d. per lb. for honey, and about 1s. 1d. for wax), would fetch about 11s. There were also hundreds of hives kept by other than professional bee keepers, which do not appear in the returns.

In reference to the paragraph in the *Agricultural News*, Vol. VI, p. 2, on *Parameria glandulifera* at Grenada, it may be of interest to note that the *Agricultural Bulletin of the Malay States*, Vol. V, no. 10, gives the following analysis of rubber from this plant: caoutchouc, 92.5; resin, 6.4; ash, 1.0. 'This apocynaceous climber is not usually considered one of the first-class rubber vines, but it is perhaps one of the best of the Paramerias, and this analysis gives it as producing a better class of rubber than that of *Ficus elastica*.'

At a meeting of the Barbados Agricultural Society on April 26, it was resolved: 'That this meeting is of the opinion that, owing to the existence of the leaf blister-mite and other cotton diseases in the neighbouring islands and elsewhere, it is necessary that all whole cotton seed imported into this island should be thoroughly disinfected on its being landed.' The Secretary was instructed to forward a copy of the resolution to the Governor-in-Executive Committee asking him to take such action as he may think fit.

A cotton plant was recently observed in a field at Barbados which was particularly noticeable on account of its flowers being almost white. The plant was marked, and the seed-cotton when picked was kept separate. The lint, however, was not of a desirable quality, being short and very coarse. This is an instance showing how a plant can develop a character very different from the rest of the plants in the same field. In this particular case the variation is valueless, but instances may occur in which the variation may prove to be a most valuable one.



## THE WORLD'S RICE CROPS.

In tropical and subtropical countries rice may be spoken of as the 'staff of life.' It is the principal food of about one-half of the people of the world.

It is stated in *The World's Commercial Products*: 'Asia is the most important rice-growing region of the world, for, excepting in the northern portions of this continent, rice is universally cultivated. Three quarters of all the rice that comes into the markets of the world is grown in British India, Bengal producing the greatest amount. Siam, China, Japan, Java, the Straits Settlements, Ceylon, the Hawaiian Islands, and other Asiatic countries all produce large quantities of rice, although not sufficient in every case to supply the local demands.'

A correspondent in Mincing Lane, London, has supplied interesting figures and information in regard to the world's rice crops, from which the following is a brief extract:—

In China rice is very extensively cultivated. No reliable statistics have ever been published as to the production, but this is much less than the demand, and consequently, large quantities are imported from Siam and Saigon. The total imports from these two countries amounted to 731,286 tons in 1904.

The average production of rice in Japan during the ten years 1894-1904 was 6,300,000 tons. The average amount exported during the four years 1901-4 was 61,708 tons, while 512,164 tons were, on the average, imported annually during the same period. Rice consumption is increasing rapidly, and Japan promises to become the largest eastern buyer of this product.

Turning to India, we find that 19,152,665 tons of rice were produced in Bengal and Madras in 1904. Rice is also cultivated, on a smaller scale, in other provinces, but no exact figures are obtainable. There was exported from India to Europe, during the three years 1902-4, an average of 65,631 tons. Calcutta also exports rice to Ceylon, Mauritius, South Africa, and Australia, the total being probably about the same as that of the shipments to Europe. In 1904, 249,000 tons were imported from Burma for Bombay and Cochin (on Malabar coast). It is observed that India's rice exports are tending to fall off, while the imports are increasing.

The rice crop of Cochin-China amounts to about 1,500,000 tons; of this some 636,000 tons are yearly exported, chiefly to France. The cultivation of rice is extending yearly.

The probable production in Siam, where rice cultivation is also extending, is 2,000,000 tons, of which 689,510 tons are exported. In Burma the crop is estimated at 3,300,000 tons. Of this amount 2,182,000 tons are annually exported, 981,000 tons going to Europe. The great bulk of Europe's rice supply is drawn from Burma, whence the product is also largely shipped to Japan, India, the Straits Settlements, and Java.

Java produces about 4,250,000 tons of rice, exporting 39,656 tons. Java exports only the best qualities and has to import from Cochin-China, Siam, and Burma on an increasing scale for her own consumption; thus, the average importation for the three years 1902-4 was 138,000 tons.

Of late years the cultivation of rice in the Gulf States of America (Carolina and Texas) has been rapidly increasing. In 1904, about 400,000 tons were produced. No exact figures are available as to the exports of this commodity from the United States, but some 30,000 tons are shipped each year to Porto Rico, and in the year 1904-5 some 7,000 tons went to Europe. The Northern States import cleaned rice from the United Kingdom and the Continent—particularly

granulated rice—in all, 20,000 to 30,000 tons annually.

Consequent upon the introduction of East Indian immigrants into the West Indies and British Guiana, rice has become a crop of some importance, more particularly in British Guiana, where, as was recently mentioned in the *Agricultural News* (Vol. VI, pp. 41 and 56), there were in 1905-6, 23,853 acres under rice cultivation, which yielded 17,443 tons. It is anticipated that the production of rice in British Guiana will shortly be in excess of the local demands, and already endeavours are being made to find an outlet for the product in the neighbouring West India Islands.

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## FOOD VALUE OF TROPICAL FRUITS.

In the *Hawaiian Forester and Agriculturist*, for October 1906, there is an article by Dr. E. C. Shorey on the food value of tropical fruits.

He defines fruits as 'those fleshy, seed-bearing plant products which are eaten simply for their agreeable taste as an accompaniment to or to give relish to other food.' However, besides being agreeable accompaniments to staple foods, it is shown by analyses that fruits have some food value of their own; that is, they contain more or less digestible proteids, carbohydrates, or fats. But fresh fruits consist usually in great part of water, which forms nearly 90 per cent. of oranges and pine-apples, and more than 75 per cent. of many other tropical fruits. Fruits have a very small amount of proteid, nitrogenous or meaty matter, and so fail of being complete foods. Thus bananas contain 1.3 per cent., avocados 1.0, oranges 0.8, and pine-apples only 0.4 per cent. of this important ingredient. The chief food value of ordinary fruits lies in the carbohydrates (chiefly sugars) which they contain. Of these, bananas have 21 per cent., mangos 15, oranges 11, and pine-apples 8, on the average. Few fruits contain fats, the avocado excepted.

Many fruits include among their components organic acids, which are more or less refreshing, and often have important effects in the preservation of health. Vegetarians who conform to a diet made in great part of fruits, consume nuts, etc., in sufficient quantities to supply the deficiencies of proteids and fats in the fruits. In the case, for instance, of one of the most nutritious of fruits, the banana, it would be necessary for a man to eat about 13½ lb. of bananas every day to get the amount of proteid necessary to keep his body in condition while doing normal work. This would give him more sugar than he required. 'There is no reason why fruits should not be considered more as actual foods than as pleasure-giving accessories, and, when the cost will allow, they should have a more prominent position in the diet of many, combining as they do, from a dietary standpoint, pleasure with profit.'

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## DEPARTMENT NEWS.

The Imperial Commissioner of Agriculture arrived at Montserrat on April 17, and left next day for St. Kitt's in R.M.S. 'Esk.' Remaining at St. Kitt's till April 19, Sir Daniel Morris proceeded to Antigua. On April 29, he left Antigua for Dominica, and is expected to return to Barbados on or about May 9.

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Mr. J. O. Maloney, Junior Assistant to the Agricultural Superintendent at Barbados, has been appointed Agricultural Instructor at Nevis. Mr. Maloney arrived at Nevis on April 18.



## THE HORSE'S FOOT.

The following remarks on the horse's foot have been issued as Leaflet No. 2 by the Royal Society for the Prevention of Cruelty to Animals. They contain a description of the structure of the horse's foot which should be sufficient to cause owners of these animals to realize the extreme care that should be exercised in the important matter of shoeing. Attention to these details will save the owner much inconvenience and expense, and the horse all unnecessary suffering:—

To most persons, the foot of the horse appears to be only a roundish, hard lump of horn, on which an iron shoe is nailed to prevent its being worn away by the roads. Such persons may perhaps hear with astonishment that it is a complete and elaborate instrument, perfectly adapted to the work it is intended to perform, and that our artificial assistance, far from preserving, often cripples, and very frequently totally ruins it.

The real foot of the horse is enclosed in a horny case called the hoof, and the outside rim of this casing forms what is called the crust or wall. The fore part is about  $\frac{1}{2}$  inch thick, becoming thinner towards the back. It extends round towards the heel, and then curves sharply inwards.

The ends which incline inwards are called the bars. In the natural state of the hoof they are quite prominent and visible; but in a horse which has been frequently shod they are often nearly obliterated, as, frequently, the farrier, by a mistaken and faulty system, cuts them almost entirely away. The mischievous effects of this practice will be seen when we come to consider the uses of the hoof. In the middle and hinder part of the foot is an elastic, horny substance, called the frog, which occupies about a quarter of the sole. It forms a soft and yielding cushion on which the horse's foot partly rests, being thus relieved from the shock of the hard hoof on the ground. This important part is, in too many instances, pared away by the ignorant and prejudiced farrier, who follows what he has been taught by those as unskilful as himself.

The part of the foot which has a plane surface which is opposed to the ground, and extends from the frog to the outside or wall of the hoof, is called the sole. It is horny and hard, yet not solid, but somewhat elastic.

In the hinder part of the foot, where the two ends of the frog terminate, are the heels; and these also are of the same horny character. To attempt a full description of the internal structure of the foot would be beyond our limits.

Immediately inside the hoof, in the fore part and sides, is the bone of the foot, properly so called, or the coffin bone, as it is termed. It fills the fore part of the hoof, and is of a light and spongy formation, being filled with numerous blood vessels, through which the circulation of this extreme part of the body is carried on, without any danger of their stoppage by means of the pressure to which they are continually subjected; the substance of the bone not only allowing the blood vessels to pass freely through, but protecting them from every obstruction. Around this bone are a great number of elastic, prominent ridges of a membranous nature, which fit exactly between similar leaves or ridges on the inner part of the hoof. The end for which they are so placed is to modify and soften the shock to which the horse's foot is naturally subjected on passing over the rough ground he has constantly to traverse, and also to attach the hoof to the bone. At its summit, in front, is fixed the large extensor tendon of the foot.

Fitting into this bone, at the top, is another, called the small pastern bone, to which is joined another strong tendon, that regulates the use of the foot. On its upper surface it forms a cube-like hollow, and receives the end of the large pastern bone; while below and behind is a small, moveable piece, named the navicular bone, which seems to have for its object the steadying and strengthening the action of the powerful flexor tendon that is inserted into the sole of the coffin-bone.

If the foot were a flat and unyielding mass, the danger of slipping would be, in many instances, very great. But instead of this, it has a prominent edge all round, which takes a firm hold of the ground, and obviates the difficulty. Further, this hoof is somewhat elastic, and on the weight of the horse being fully thrown on it, allows the inner soft cushion or frog to descend, and press firmly and tightly on the earth. Thus, two ends are wonderfully and completely attained; firmness in the tread, ensuring the horse's safety, and a regularity of pressure which obviates the jarring that would be so painful and prejudicial.

When the animal is in a state of nature, its hoof is strong enough to need no artificial protection; but on the hard and stony roads common in all civilized countries, it has been found necessary to fit something to the foot to protect it from the great wear and tear which is unavoidably incurred. For this purpose nothing has been found so effectual as what is termed shoeing, or affixing a thin plate of iron round the outer hard and horny edge of the hoof—a practice known in Britain during the time of the Romans. When done with judgement, the proper action of the foot goes on nearly as usual; but, if injudiciously performed, the action of the horse is impeded, lameness is caused, and temporary or permanent diseases are brought on. The smaller the shoe the better, as a rule.

Many persons, from an idea of saving time, desire the smith to come and shoe their horses, instead of sending them to the forge. This should never be done. For when the workman is by his fire, if the shoe should not quite fit (as is nearly certain to be the case) he can easily heat and alter it; but if at a distance, in the farmer's or gentleman's stable, he has not the opportunity of doing so, and can only make foot and shoe match by cutting away the wall of the hoof—a most dangerous practice.

To those who consider the matter, it must be obvious that this tender and important organ ought not to be left to the care of an ignorant, and too often brutal, smith without supervision. His trade requires judgement and discretion; and there are no better means of ensuring careful shoeing than for the horse-proprietor to visit the forge, while the horse is being shod, and observe the proceedings. More depends on the preparation of the foot than on the affixing of the shoe; for the latter will hardly do much damage, unless made outrageously bad, or nailed on in a most clumsy manner; but it should be constantly kept in mind that a horse may be easily lamed from rash and ignorant paring of the hoofs. Indeed, the great evils of shoeing are cutting the sole and frog, putting on too heavy or too small shoes, and rasping the outer surface of the wall of the hoof. Sometimes, also, the shoes are allowed to remain on the feet for too long a period. They ought to be regularly attended to at intervals of about three or four weeks, and no misplaced ideas of economy should allow a longer period to elapse without an inspection of the feet.



## DISTRIBUTION OF RUBBER PLANTS FROM KEW.

The following note is taken from the *Kew Bulletin*—No. 3, 1907 :—

The importance of rubber as a cultivated crop in our Asiatic possessions engaged the attention of the India Office about the year 1872, and the introduction into India, through the agency of Kew, of the principal American rubber-yielding plants was shortly thereafter decided upon.

The first stock of Central American rubber (*Castilloa elastica*) was raised from cuttings brought by Mr. R. Cross in 1875. In June 1876, 70,000 seeds of Para rubber (*Hevea brasiliensis*), were brought to England from the Rio Tapajos by Mr. H. A. Wickham, who had been commissioned to collect them. These were followed in November by about 1,000 young plants obtained by Mr. Cross, who had been sent to South America to bring home living plants in the event of its proving impossible to transmit alive to this country the very perishable seeds which Mr. Wickham had been commissioned to procure. As a matter of fact, only about  $3\frac{3}{4}$  per cent. of the seeds germinated and an extremely small proportion of the plants ultimately survived. At the same time Mr. Cross brought home seeds and plants of Ceara rubber (*Manihot Glaziovii*). At a later date *Hevea Spruceana* was obtained.

For the introduction of African rubbers belonging to the genus *Landolphia* in 1878-9, Kew was indebted to Sir J. Kirk, then H. B. M. Consul-General at Zanzibar. More recently the introduction of *Funtumia elastica* was effected from West Africa.

## IMPERIAL DEPARTMENT OF AGRICULTURE.

### Sale of Pedigree Stock.

The following animals, the property of the Imperial Department of Agriculture for the West Indies, are offered for sale :—

One *Devon Bull*, now at Montserrat; about three years old; purchased from the Royal Farms, Windsor, in 1904. Original cost, £40; offered for £25.

One *Hereford Bull*, imported from Canada in 1902; about seven years old; now at Montserrat. Original cost, £35; offered for £15.

One *Berkshire Boar*, now at Montserrat; not quite four years old; imported from the Royal Farms, Windsor, in 1904; original cost, £8; offered for £4.

One *Pony Stallion 'Norman'*; now at Nevis. Bay, with black points;  $14\frac{1}{2}$  hands; twelve years old; purchased in Jamaica in 1900. Original cost, £55; offered for £25.

One fine *Ayrshire Bull*, 'Stamp 3rd.' now at St. Kitt's; four years old; imported from Canada in January 1907. Original cost, £25; offered for £20.

The animals may be seen and examined in the several islands named, on application to the local officer of the Department of Agriculture. They are all believed to be in sound condition, but the Department is not prepared to incur any responsibility on this point. In cases where any of the animals may be required to be shipped to another island, the actual expenses incurred would require to be paid in addition to the prices above stated. Offers up to May 15 next may be forwarded to :—The Imperial Commissioner of Agriculture for the West Indies, Head Office, Barbados.

## WEST INDIAN PRODUCTS.

### Drugs and Spices in the London Market.

The following report on the London drug and spice market for the month of March has been received from Mr. J. R. Jackson, A.L.S. :—

The condition of the market in spices and drugs during the first part of the month has been quite of an average character, a dull tone prevailing in the last week, with the approach of the Easter holidays. It will be seen from the following details that but very little change has occurred in the position of the chief articles affecting the West Indies, since last month's report.

#### GINGER.

At the first spice sale, on the 6th., some 475 bags of Jamaica were offered, of which 30 were sold at 60s. for ordinary small damaged. A week later, there was a fair demand, good middling to fair bright, new crop Jamaica, fetching 74s. to 80s.; 40 packages were disposed of at these rates out of 175 offered. It was reported at this sale that some 100 bags of Sierra Leone had been disposed of at 30s. on the quay at Liverpool. No change in prices occurred during the remainder of the month.

#### NUTMEGS, MACE, AND PIMENTO.

In these spices remarkably little interest has been shown during the whole month. At the sale on the 13th., 85 packages of West Indian nutmegs were offered, and sold at full rates. Pimento was quoted at the same sale at  $2\frac{3}{4}d.$

#### ARROWROOT.

At the first two auctions none was offered, but on the 20th. there was a steady demand for good manufacturing St. Vincent, of which 380 barrels were offered and 140 sold at  $2\frac{3}{8}d.$

#### SARSAPARILLA.

At the beginning of the month, the following were the quotations: Lima-Jamaica, 3s. 6d.; grey Jamaica, 4s. 9d.; and good, red, native Jamaica, 2s.  $4\frac{1}{2}d.$  to 2s. 6d.; a week later prices had lowered, 3s. 9d. being paid for 8 bales of fair grey Jamaica, while 4s. 3d. was asked for 5 other bales, at which price they were bought in. Native Jamaica was steady, 2s. 3d. being paid for fair red, 2s. 1d. for pale red, and 2s. for yellow. Honduras was bought in at 2s. 3d. These prices remained unaltered to the close of the month, the latest arrivals being 8 bales of grey Jamaica, 16 of Lima-Jamaica, and 6 of native Jamaica.

#### KOLA NUTS, OIL OF ORANGE, ETC.

Of other products native of, or interesting to, the West Indies, the following may be mentioned :—

Quillaja bark: a considerable business is reported to have been done in this article in Liverpool at full to higher prices.

Of kola, in the middle of the month, 4 bags, dark and rather mouldy Jamaica, realized 3d. per lb. At the same sale a case of West Indian oil of orange realized 6s. 3d. per lb., and fair West Indian distilled oil of lime fetched from 3s. to 3s. 1d. per lb. A large quantity of quassia chips was also offered, for which £12 per ton was asked.

Dark Mombasa chillies have been quoted at 16s. to 16s. 6d., and fair at 17s.

For Barbados tamarinds, reported to be scarce, 21s. to 22s. was asked, while good Calcutta were offered at 13s. 6d.



## MARKET REPORTS.

**London**,—April 9, 1907. 'THE WEST INDIA COMMITTEE CIRCULAR,' MESSRS. KEARTON, PIPER & Co.; MESSRS. E. A. DE PASS & Co., April 5, 1907; 'THE LIVERPOOL COTTON ASSOCIATION WEEKLY CIRCULAR,' April 5, 1907.

ARROWROOT—St. Vincent,  $2\frac{1}{4}d.$  to  $2\frac{3}{4}d.$  per lb.  
BALATA—Sheet,  $2/6$  to  $2/7$ ; block,  $1/10$  to  $1/10\frac{1}{2}$  per lb.  
BEES'-WAX—£7 10s. to £8 per cwt.  
CACAO—Trinidad, 85/- to 90/- per cwt.; Grenada, 77/- to 82/- per cwt.  
COFFEE—Jamaica, low ordinary, 37/-; ordinary to good ordinary, 41/6 to 48/-; fine ordinary to good middling, 53/6 to 66/6 per cwt.  
COPRA—East Indian, £25 to £26, c.i.f. per ton.  
COTTON—Good medium fine, 6'90d.; West Indian Sea Island, good medium,  $19\frac{1}{2}d.$ ; medium fine,  $20\frac{1}{2}d.$ ; fine, 22d.  
FRUIT—  
GRAPE FRUIT—10/- to 12/- per box.  
BANANAS—Jamaica, 4/- to 6/- per bunch.  
ORANGES—No quotations.  
PINE-APPLES—St. Michael's, 2/6 to 5/6 each.  
FUSTIC—£4 5s. to £4 15s. per ton.  
GINGER—Jamaica, common, 65/- to 66/-; ordinary and good bright, 74/- to 80/- per cwt.  
HONEY—20/- to 25/- per cwt.  
ISINGLASS—West Indian lump, 1/10 to 1/11 per lb.; cake, no quotations.  
LIME JUICE—Raw, 1/6 per gallon; concentrated, £24 per cask of 108 gallons; Distilled Oil, 2/11 per lb.; hand pressed, 3/6 per lb.  
LOGWOOD—£4 5s. to £4 15s.; roots, £3 5s. to £4 5s. per ton.  
MACE—Good pale, 1/11 to 2/3; good red, 1/7; broken, 1/4 per lb.  
NUTMEGS—66's, 1s. 1d.; 83's, 10d.; 98's,  $7\frac{1}{2}d.$ ; 100's, 7d.; smalls, (128's to 137's),  $5\frac{1}{2}d.$  to 6d. per lb.  
PIMENTO—Fair,  $2\frac{1}{6}d.$  per lb.  
RUM—Jamaica, 2/7; Demerara, 1/- to 1/1 per proof gallon.  
SUGAR—Crystals, well made yellows, 16s. to 18s.; Muscovado, 13s. 6d. to 16s.; Molasses, retail 11/- to 14/- per cwt.

**Montreal**,—January 18, 1907.—Mr. J. RUSSELL MURRAY.  
(In bond quotations, c. & f.)

COCOA-NUTS—Jamaica, \$27.00; Trinidad, \$25.00 per M.  
COFFEE—Jamaica, medium, 10c. to 12c. per lb.  
GINGER—Jamaica, unbleached, 13c. to 14c. per lb.  
MOLASSES—Barbados, 27c. to 28c.; Antigua, 25c. to 26c. per Imperial gallon.  
NUTMEGS—Grenada, 110's, 15c. to 16c. per lb.  
PIMENTO—Jamaica,  $5\frac{1}{4}c.$  to  $5\frac{1}{2}c.$  per lb.  
SUGAR—Grey crystals, 96°, \$1.98 to \$2.05 per 100 lb.  
—Muscovados, 89°, \$1.40 to \$1.50 per 100 lb.  
—Barbados grocery, \$2.10 to \$2.25 per 100 lb.

**New York**,—April 5, 1907.—Messrs. GILLESPIE BROS. & Co.

CACAO—Caracas,  $17\frac{3}{4}c.$  to 27c.; Grenada,  $16\frac{3}{4}c.$  to  $17\frac{1}{4}c.$ ; Trinidad, 18c. to  $18\frac{3}{4}c.$ ; Jamaica, 15c. to 17c.; Dominica,  $16\frac{1}{2}c.$  per lb.  
COCOA-NUTS—Jamaica, \$23.00 to \$25.00; Trinidad, \$22.00 to \$24.00 per M.  
COFFEE—Jamaica ordinary, 8c. to  $8\frac{1}{4}c.$ ; good ordinary,  $8\frac{3}{4}c.$  per lb.  
GINGER—Dark scraggy root,  $11\frac{1}{2}c.$  to  $12\frac{1}{4}c.$ ; small to bright bold,  $12\frac{1}{2}c.$  to  $15\frac{3}{4}c.$  per lb.  
GOAT SKINS—Jamaica, Antigua, and Barbados, 59c.; St. Kitt's, St. Thomas, and St. Croix, 54c. to 59c. per lb.  
GRAPE FRUIT—Jamaica, \$5.00 to \$7.00 per barrel; \$2.00 to \$3.00 per box.  
LIMES—\$7.00 to \$9.00 per barrel.

MACE—34c. to 36c. per lb.

NUTMEGS—95's to 100's,  $17\frac{1}{2}c.$ ; 100's to 110's, 13c.; 130's to 140's, 12c.; broken and shrivels,  $7\frac{1}{2}c.$  to 8c.

ORANGES—Jamaica, \$4.00 to \$5.00 per barrel; \$2.50 to \$3.50 per box.

PIMENTO— $5\frac{1}{4}c.$  per lb.

SUGAR—Centrifugals, 96°, 3.61c. to 3.67c.; Muscovados, 89°,  $3\frac{1}{2}c.$ ; Molasses, 89°, 2.91c. per lb., duty paid.

## INTER-COLONIAL MARKETS.

**Barbados**,—April 22, 1907.—Messrs. T. S. GARRAWAY & Co., and Messrs. JAMES A. LYNCH & Co., April 23.

ARROWROOT—St. Vincent, \$4.07 to \$4.75 per 100 lb.

CACAO—Dominica, \$14.50 per 100 lb.

COCOA-NUTS—\$14.00 per M. for husked nuts.

COFFEE—\$10.10 to \$10.50 per 100 lb.

HAY—\$1.00 to \$1.30 per 100 lb.

MANURES—Nitrate of soda, \$65.00; Ohlendorff's dissolved guano, \$55.00; Cotton manure, \$42.00; Cacao manure, \$42.00 to \$48.00; Sulphate of ammonia, \$75.00; Sulphate of potash, \$67.00 per ton.

MOLASSES—15c. per gallon.

ONIONS—Antigua, strings, \$2.50, loose, \$2.00 to \$2.75; Tenerife, bunched, \$3.00, loose, \$2.50 per 100 lb.

POTATOS, ENGLISH—\$3.25; Canadian, \$2.10 to \$2.40 per 160 lb.

RICE—Demerara, \$5.65 to \$5.75; Ballam, \$5.50 to \$5.90 per bag (190 lb.); Patna, \$3.00 to \$3.75; Rangoon, \$2.90 to \$3.00 per 100 lb.

SUGAR—Dark crystals, \$2.15 to \$2.20; Muscovado, \$1.75 per 100 lb.

SYRUP—17c. per gallon.

**British Guiana**,—April 27, 1907.—Messrs. WIETING & RICHTER.

ARROWROOT—St. Vincent, \$11.00 per barrel.

BALATA—Venezuela block, 32c.; Demerara sheet, 48c. per lb.

CACAO—Native, 17c. to 18c. per lb.

CASSAVA—80c. to \$1.20 per barrel.

CASSAVA STARCH—\$6.00 per barrel.

COCOA-NUTS—\$12.00 to \$16.00 per M.

COFFEE—Creole, 14c. to 15c.; Jamaica, 14c. to  $14\frac{1}{2}c.$  per lb.

DHAL—\$4.65 to \$4.75 per bag of 168 lb.

EDDOS—\$1.08 to \$1.32 per barrel.

MOLASSES—16c. per gallon.

ONIONS—Lisbon, 4c. to  $4\frac{1}{2}c.$  per lb.

PLANTAINS—20c. to 36c. per bunch.

POTATOS, ENGLISH—Nova Scotia, \$2.90 to \$3.00 per barrel

POTATOS, SWEET—Barbados, \$1.56 per bag.

RICE—Ballam, \$5.90 per 177 lb.; Creole, \$4.75 to \$4.80 per bag (ex store); Seeta, \$5.50 to \$6.00; Patna, \$5.00.

SPLIT PEAS—\$5.80 per bag (210 lb.).

TANNIAS—\$2.40 per bag.

YAMS—White, no quotations; Buck, \$2.16 per bag.

SUGAR—Dark crystals, \$2.00 to \$2.10; Yellow, \$2.60 to \$2.70; White, \$3.60 to \$3.70; Molasses, \$1.40 to \$1.75 per 100 lb. (retail).

TIMBER—Greenheart, 32c. to 55c. per cubic foot.

WALLABA SHINGLES—\$3.00 to \$5.75 per M.

**Trinidad**,—April 27, 1907.—Messrs. GORDON, GRANT & Co.

CACAO—Ordinary to good red, \$18.50 to \$18.75; estates, \$19.00 per fanega (110 lb.); Venezuelan, \$18.50 to \$18.75.

COCOA-NUTS—\$21.00 per M., f.o.b.

COCOA-NUT OIL—90c. per Imperial gallon (cask included).

COFFEE—Venezuelan, 8c. to  $8\frac{1}{2}c.$  per lb.

COPRA—\$4.00 to \$4.15 per 100 lb.

DHAL—\$4.40 to \$4.70 per 2-bushel bag.

MOLASSES—No quotations.

ONIONS—\$3.00 to \$4.00 per 100 lb. (retail).

POTATOS, ENGLISH—\$1.50 to \$2.00 per 100 lb.

RICE—Yellow, \$5.50 to \$5.75; White, \$5.75 to \$6.00 per bag.

SPLIT PEAS—\$5.40 to \$5.60 per bag.

SUGAR—Crystals, \$2.00 to \$2.50.





## A FORTNIGHTLY REVIEW OF THE IMPERIAL DEPARTMENT OF AGRICULTURE FOR THE WEST INDIES.

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### Agriculture in the Leeward Islands.

**T**HE last issue of the *Agricultural News* (pp. 131 and 134) contained extracts from the *Annual Colonial Report* on the Leeward Islands for 1905-6, reviewing the condition of the various agricultural industries of the different

islands, and incidentally indicating the efforts that were being made by the Imperial Department of Agriculture towards improving those industries.

Sugar is the principal industry of Antigua and St. Kitt's, but, owing to a prolonged drought, the crop of 1905-6 in the former island was particularly short. In Nevis, and especially in Montserrat, the sugar industry is in a decadent condition, but it would appear that cotton is gradually taking the place of cane as the staple crop.

The central factories at Gunthorpe's and Bendal's, Antigua, were steadily at work during 1905-6; but on account of the particularly unfavourable season, there was a shortage of crop and a deficiency of water for proper maceration of the crushed canes in the mills. The profits from these concerns were considerably lessened, and in the case of the Antigua Sugar Factory at Gunthorpe's, after charging the expenses of the year and placing £2,000 to the sinking fund, only £331 17s. 10d. remained for distribution to the 'contracting planters.' The present year (1906-7), however, has been much more favourable and the prospects for a successful working are decidedly hopeful, since a better appreciation of the advantages offered and the augmented railway facilities have had the effect of considerably increasing the area under cultivation in cane, especially with peasant proprietors.

The experiments with sugar-cane carried on, under the direction of the Imperial Department of Agriculture, at Antigua and St. Kitt's, with a view to finding varieties of sugar-cane which are likely to give increased yields of sugar, as well as being more resistant to disease, and to ascertaining the effect produced



by artificial manures when used in addition to the usual applications of pen manure employed in local practice, have been continued. The results show that B. 208 and Sealy Seedling may be recommended for extended trial at the hands of planters, that the use of artificial manures for *plant* canes is unremunerative, provided that the usual quantity of good pen manure is applied, and that increased crops from *ratoons* are obtainable by applications of artificial manures.

Encouraging progress has been made in the cultivation of Sea Island cotton during the past year; 1,800 acres were under cultivation in Antigua, 1,100 in Montserrat, 3,000 in St. Kitt's-Nevis, and 1,000 in Anguilla; while in the Virgin Islands the cultivation of cotton is steadily being extended.

In St. Kitt's, most of the cotton crop occupies the position of a rotation crop with sugar-cane, only a small part being planted as a main crop; but in Nevis and Montserrat it would appear that cotton is gradually becoming the main crop.

The yield of cotton in St. Kitt's has not, on the whole, been equal to that of last season, but with the good prices that have been obtained, the results are quite satisfactory; while in Nevis, owing to an unfavourable season, only a small yield of cotton per acre has been gathered, with the result that the returns are not so satisfactory as was at one time expected, and, taking the island as a whole, the crop will be a very short one for the acreage planted. In Montserrat, the cotton industry is flourishing, the crops during the last season having been generally satisfactory and the prices good.

The lime industry has been re-established in Montserrat since the hurricane of 1899, and in Dominica very large numbers of lime trees have been planted of late. In fact, the demand for lime plants from the Dominica Botanic Station has been so great that planters have been advised to start nurseries of their own.

The exports of raw and concentrated lime juice from Dominica increased during 1906 to 300,003 gallons, valued at £44,486, as against 289,100 gallons, valued at £32,966, exported during the previous year. There has also been an increased exportation of green and pickled limes, and the manufacture of citrate of lime is now well under way, as in Dominica the value of exported citrate of lime was £1,503. The general results so far are satisfactory. The important point is to ascertain exactly the advantage offered to

the planter by making citrate of lime as compared with concentrated juice.

Cacao continues to progress in Dominica and the value of the exports for last year was £35,185, as compared with £25,554 during 1905. Small areas are in course of being planted in cacao in St. Kitt's-Nevis and Montserrat.

Of the minor industries, the planting of oranges in Dominica deserves more than a passing note, while the cultivation of onions is being continued in Antigua. Experimental planting of rubber is being extended in all the islands, and it is anticipated that *Castilloa* is likely to give satisfactory yields in Dominica, where there are, at present, a large number of trees.

The Botanic Station in each presidency has rendered valuable assistance in the extension of plantations, by the distribution of seeds, plants, etc., and it is recognized that 'in all the foregoing developments and efforts at advancement, the Imperial Department of Agriculture has played a leading part.' The experiments with sugar-cane, cacao, rubber and cotton are being followed with considerable interest by planters.

The recent tour of the Imperial Commissioner of Agriculture in the Northern Islands, extending from April 14 to May 10 last, has been the means of enabling him to make satisfactory arrangements for the supply of specially selected cotton seed for planting during the coming season, so that with favourable weather conditions, it is not improbable that from the crops to be reaped in 1907-8 there will be considerable increase in the exports of Sea Island cotton of high quality. The general conditions in regard to the sugar crops are more favourable than they have been for some time, while the increased care and attention that are being devoted to the raising of improved breeds of horses and cattle are having a good influence in increasing the resources and comfort of all classes of the community. The rearing of better varieties of poultry and rabbits and the extension of bee keeping are also factors tending towards a general improvement, especially of the peasant class.

Altogether the out-look in the Leeward Islands is of a distinctly promising character, and with the active co-operation of the Executive as well as of the various officers of the Imperial and Local Departments of Agriculture, and of the increasing interest and support that is now being accorded by the members of the planting community, there is no reason why, within the next few years, the Leeward Islands should not regain, to a considerable degree, their former prosperity.



## SUGAR INDUSTRY.

### Improvement of the Sugar-beet.

In an article entitled 'Current Investigations in Economic Botany,' published in the *New Phytologist* for January, 1907, Mr. W. G. Freeman, B.Sc., F.L.S., gives an account of the improvement of the sugar-beet, which is interesting in so far as it affords a striking example of the successful application of science to plant industry.

The sugar beet is closely related to the garden beet, familiar to everyone as a vegetable, and to the mangel-wurzel, grown as a cattle food. It is white-fleshed, deep-rooted and somewhat fibrous, and now contains about 18 per cent. of sugar as against 8 per cent. in the mangel-wurzel.

Beet 'balls,' each containing several seeds are sown, and the resulting seedlings thinned out. They grow during the summer, and the crop is dug before the approach of frost. The leafy 'tops' are cut off, and the roots used at once for sugar manufacture, or stored (1) for extraction of sugar in the spring or (2) for seed purposes.

In selecting roots for seed purposes attention is given to (1) weight, from 20 to 24 oz., (2) regular and smooth shape, and (3) general appearance; while in the following spring a further selection is made for (4) keeping qualities, before they are finally analysed for (5) sugar contents, and (6) co-efficient of purity.

Those roots that ultimately pass the chemists with a good percentage of sugar are planted in the second year and bear a crop of seed in the autumn of the same year.

So readily did the sugar-beet respond to this careful selection that de Vilmorin records that within a period of three generations, the selected roots gave sugar contents of 16 and 21 per cent. from stock plants with sugar contents from 8 to 12 per cent. only, and it was soon realized in Germany that this improvement could only be maintained by giving continued attention to proper seed selection, by forming a system of organization that allows the large factories to control and supervise the work, and to ensure having their crops grown only from seed chosen, with every care, in accordance with their own particular requirements.

Recently the Department of Agriculture in the United States of America has undertaken the determination of the influence of environment upon the composition of the sugar-beet, and the results at present indicate that there is a close agreement between latitude and sugar contents.

Their results may be summarized as follows: (1) high latitudes are correlated with high percentages of sugar, (2) increase of temperature produces decrease in sugar contents, (3) long days are associated with high sugar contents, and (4) the actual quantity of rain that falls during a year has less influence on the plant than the manner in which it is distributed throughout the year. These results are very interesting, but owing to the experiments having been conducted in distinct localities, the problem is not easy to solve, as many factors have to be taken into consideration, and experiments conducted for several seasons before definite conclusions can be arrived at.

Thus chemical selection along definite lines has been the means of marked improvement in the sugar-beet, the cultivation of which has placed Europe first amongst the continents as regards sugar production. This shows clearly how up-to-date scientific methods may do much towards benefiting an industry that has to withstand all the effects of keen commercial competition.

### Sugar in the Philippines.

The cultivation and methods of production of sugar in the Philippines could be considerably improved, for the following abstract from an article by Mr. W. C. Welborn, in the *Hawaiian Planters' Monthly* for January, points, briefly, to its backward condition:—

Sugar production in the Philippine Islands is perhaps in a more backward condition than in any other country; owing, probably, to the lack of capital. Philippine sugar is made by processes which Java and Cuba began to lay aside fifty years ago. Two primitive methods for making sugar are in vogue in the Philippines. One is to boil down the juice to syrup in open kettles over a direct fire, and put the syrup into large earthenware vessels to crystallize, allowing the molasses to drain out through holes in the bottom; while the other is to boil down the juice till nearly dry and sell the concrete sugar thus made. The Chinese are large consumers of this concrete sugar.

The Filipino cannot ever make cheap sugar while he uses such primitive machinery. There is no exception to the rule that the greater the investment in suitable machinery, the cheaper the cost of production. Therefore, it would appear that what is needed for the improvement of the sugar industry in the Philippines is capital.

### New Sugar Factory in Cuba.

The *Cuba Review*, for March 1907, gives an account of a large new sugar factory which has commenced work at Preston, Nipe Bay, Cuba.

About 26,000 acres were cleared and 14,000 planted in cane for this year, while the building of the factory was begun in March 1906. The three mills began grinding cane on January 19, 1907. Twenty-seven miles of standard-gauge railway track extend to all parts of the cane-fields. There are 2,500 head of oxen which bring the canes to the railway cars. A large electric plant has been established; large electric cranes raise the canes, a car-load of 20 tons at a time, to the two cane hoppers, and all conveyance of canes, megass, or sugar in the mills is done by electricity, by which the mills and the houses where the work-people dwell are lighted. The electric plant is large enough to supply light and power for a town of 4,000 inhabitants.

The mills were turning out 1,000 to 1,600 sacks of sugar a day, but will produce double this quantity when complete. At present 10 tons of cane produce 1 ton of crystals; but the results are found to improve, when ratooning on the virgin soils of Cuba, up to the fifth year. There are automatic trash cleaners in the mills, and the megass is conveyed by electric conveyers to the furnaces which heat the ten boilers. There are twenty-four clarifiers, and twelve more are being set up. The juice passes through twenty-two mechanical filters, and their number is being increased. There are also twenty-four of the largest size filter presses. Quadruple effect apparatus is used, and the condensed steam goes to feed the boilers, thus avoiding 'boiler scale.' No steam is wasted throughout. For condensing, the mills use daily 72,000 tons of sea-water which is raised by powerful centrifugal pumps. The vacuum or crystallizing pans on the upper floor have a capacity of 70 tons each. There are twenty-four centrifugals, each in charge of one man; but, with training, one man can attend to two centrifugals. These mills will grind cane continuously, day and night, for about eight months every year. There will be about 4,000 persons employed, and the pay-roll is about £12,000 a month. The sugar boilers and other skilled men receive about £25 a month.





## WEST INDIAN FRUIT.

### THE STAR-APPLE.

The star-apple (*Chrysophyllum Cainito*) is related to the sapodilla, and is also a native of tropical America. It derives its name from the eight- to ten-rayed star shown when the end of the fruit is sliced off.

The tree is about 30 feet high, with oblong leaves some 6 inches in length, and golden-brown on the under sides. The small purplish-white flowers are in axillary clusters, each flower consisting of a five-lobed calyx and corolla, five stamens opposite the petals, and a ten- to eight-celled ovary. The fruit is globose, about 3 inches in diameter, having an outer pulpy layer, which may be deep purple, or white with green skin, and  $\frac{1}{4}$  inch or more thick. Inside are the seeds, usually one in each cell, surrounded by a sweet, transparent, jelly-like tissue.

The whole plant is permeated with latex ducts, and these may be seen readily on the outer pulpy layer of the fruit. This fruit is one which is 'well liked even by people of a temperate clime.' The seeds are about  $\frac{1}{2}$  inch long, and the embryo has large flat seed-leaves surrounded by a thin endosperm. The number of seeds varies, and it would seem possible, by selection, to procure a variety with few or no seeds. The star-apple may be grown occasionally from cuttings.

### THE WASHINGTON NAVEL ORANGE.

It would appear that the Washington Navel orange originated in Brazil in an unknown manner. In 1870, twelve budded trees of this variety were obtained from Bahia by the Department of Agriculture at Washington. Thence budded trees were sent to California and Florida.

It was reckoned that in about 1901, there were nearly six million orange trees in California, of which more than half were Washington Navels. This orange does not yield nearly so well in Florida or Arizona as in certain districts of California. It is cultivated successfully in some parts of Mexico.

The tree is a half-dwarf, moderately spiny, of rapid growth and early bearing. The leaves are large, with prominent wings. The flowers are double, rarely have any pollen, and the pistil is often incapable of fertilization.

The fruits are large, strongly coloured, solid, and heavy. Their rind is smooth and finely textured, with the navel markings at the end. The pulp is semi-fluid and of excellent flavour. There are very rarely any seeds.

The productiveness of the trees seems to be influenced greatly by different climatic conditions, the effect of which can only be determined by trial.

### LIME INDUSTRY IN BRITISH GUIANA.

Towards the end of 1906, Mr. W. L. Bennett was sent by Messrs. Harvey, Lockie & Co., London, to seek a suitable site for an extensive lime plantation in the West India Islands or British Guiana.

He visited, with this object, Dominica, Montserrat, St. Lucia, Trinidad, and British Guiana, and returned to England reporting in favour of British Guiana, where much land suitable for lime cultivation is to be found. The result of this mission is that a syndicate has been formed to commence a lime industry in that colony for the manufacture of citric acid.

Recently, Mr. H. Lloyd Wilson, senior partner of the firm of Messrs. John and E. Sturge, Birmingham, (one of the firms of the syndicate) has been paying a visit to British Guiana to see after the preliminaries, and to ascertain what steps should best be taken to start the enterprise.

A grant of land of 1,500 acres has been obtained from the Government at Agatash, on the west bank of the Essequibo River, and the work of clearing and preparing for planting is to be commenced immediately, while the manufacturing plant is, for the present, to be established at Aurora, where the supply of limes is plentiful.

Interviewed by a representative of the *Demerara Daily Chronicle*, Mr. Wilson pointed out that the bulk of citric acid comes from the Mediterranean—from Sicily—the lemon being used in the manufacture. The Sicilians, having control of the production, forced the prices up, and therefore manufacturers had to look elsewhere for the supplies they needed.

The West Indian lime is superior to the lemon in every way for this purpose, and the manufacture of citric acid is now being carried out in Dominica and Montserrat. Citric acid is not shipped as such, but by treatment with ordinary lime is converted into citrate of lime, as in that way the cost of freight is considerably reduced.

'There is every possibility that British Guiana will yet become an important source of supply for citric acid—an article of commerce that enters largely into a variety of processes. It is used, for example, in drugs and pharmacy; to a slight extent in photography; in calico printing and dyeing; and in the manufacture of aerated waters.'

The firms associated with the enterprise have already given evidence that they are determined to develop the business, and are losing no time in starting to work.



## THE GUAVA.

The common guava (*Psidium Guajava*) is a member of an American genus of about 130 species, many of which have edible fruits. It belongs to the order *Myrtaceae*, and is related to the rose-apple, Java plum, Surinam cherry, pomegranate, and pimento.

The common guava is a shrub or low tree, 6 to 15 feet high. The leaves are papery, elliptical-oblong, with depressed pinnate veins. The white flowers, about 1 inch in diameter, are borne in the axils of the leaves, one or more in each axil. Each flower possesses a tough green calyx, which splits irregularly when the bud opens, allowing the expansion of the four to five white petals and the numerous stamens.

The fruit is commonly oval or globose, of lemon-yellow colour, and is crowned with the dry calyx. It is often scented, and on healthy trees may be 2 to 3 inches long. The tender skin encloses a reddish or yellowish pulp that has the peculiar guava flavour. In the middle part of the pulp the small seeds are embedded.



FIG. 13. FRUITS OF GUAVA.  
(From *The Book of Trinidad*.)

There are several varieties of the common guava which are sometimes cultivated; distinguished by the shape and size of the fruit, colour of pulp or skin, or paucity of seeds. The best guavas sometimes form desert fruits, or are eaten stewed with sugar, or are made into a preserve. The firm jelly prepared from this fruit is much appreciated by many, and often commands good prices in Europe when put up in an attractive form.

The guava is quite a variable plant, and therefore considerable improvement could be obtained by selecting and propagating the superior individuals by grafting or by cuttings.

Other species of cultivated guavas are the Brazil and the Guinea guava (*Psidium Araca*), the strawberry guava (*Psidium Cattleianum*), and the Costa Rica guava (*Psidium Friedrichstalianum*).

Fig. 13 represents an upright fruiting branch of a guava, showing two open flowers, and two fruits cut open.

## EFFECTS OF PRUNING.

An account of experiments in pruning apple trees, carried on for twelve years at the Woburn experimental fruit farm, is given in *Nature* for April 11.

Trees which had not been pruned for twelve years produced more new wood than those which had been pruned during the same period. In the first five years the unpruned trees gave more than twice as much fruit as the moderately pruned trees, and three times as much as the heavily pruned. In the next five years the differences were still greater. But in one case it was found that heavy pruning was advantageous. When trees were first planted, their roots were unavoidably injured, and unless the tops were heavily pruned there would be precocious fruiting which might result in permanent stunting. Thus with freshly planted trees, those which were not pruned had leaves 24 per cent. less in size, and formed 45 per cent. less new wood than those which had been heavily pruned.

## USE OF THE HYDROMETER IN MAKING CONCENTRATED LIME JUICE.

There appears to be a tendency in making concentrated lime juice to concentrate to too high a degree. This results in a destruction of citric acid, and, therefore, the following note from Dr. Francis Watts should be of interest, as by the use of the hydrometer and the scale given, a planter can ascertain rapidly the strength of the concentrated juice that he is producing:—

In previous publications it has been recommended that in preparing concentrated lime juice the concentration should be carried on until a 'citrometer' floating in the hot juice (at boiling heat) indicates a density of 60° (*West Indian Bulletin*, Vol. II, p. 309).

As the citrometer is an instrument but little known, difficulty has at times been experienced in procuring it. Its use, however, can be dispensed with, and an ordinary specific gravity hydrometer, the nature of which is universally understood, can be substituted, by making use of the fact that 60° on the citrometer is equivalent to 1.243 on a specific gravity hydrometer.

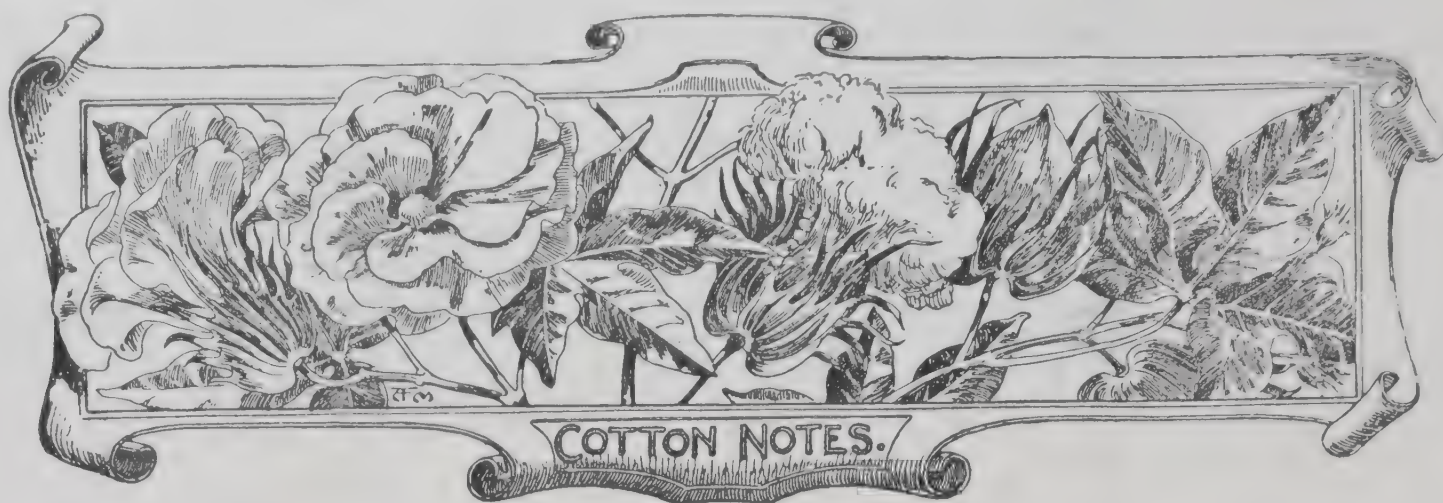
In this connexion the following scale may be useful:—

50° citrometer	= 1.202 sp. gr.	57° citrometer	= 1.231 sp. gr.
51° "	= 1.207 " "	58° "	= 1.235 " "
52° "	= 1.211 " "	59° "	= 1.239 " "
53° "	= 1.215 " "	60° "	= 1.243 " "
54° "	= 1.219 " "	61° "	= 1.248 " "
55° "	= 1.223 " "	62° "	= 1.252 " "
56° "	= 1.227 " "	63° "	= 1.256 " "
		64° "	= 1.260 " "

Suitable specific gravity hydrometers graduated from 1.200 to 1.300 specific gravity can be obtained from makers of scientific instruments at a cost of about 2s. each.\*

\* Such an instrument appears under No. 1,817 in the catalogue of Messrs. Baird & Tatlock, Cross Street, Hatton Garden, London, E.C.





### WEST INDIAN COTTON.

Messrs. Wolstenholme & Holland, of Liverpool, have forwarded the following report, dated April 22, on the West Indian Sea Island cotton market:—

Since our last report West Indian Sea Islands have been in good demand, but spinners are showing less disposition to pay the prices ruling, and this feeling will probably be accentuated as the season goes on, present rates being so much higher than for years past.

The business includes Nevis, 22*d.* to 22½*d.*; St. Thomas, 23*d.*; St. Martins, 23½*d.* to 24*d.*; St. Kitt's, 23*d.* to 24*d.*; Montserrat, 23*d.* to 24*d.*; Anguilla, 23*d.* to 24*d.*; Barbados, 23*d.* to 26*d.*; Antigua, 24*d.* to 28*d.*; and St. Vincent, 25*d.* to 30*d.*

So far as we can see, there is only a demand for about 500 bales more at these prices, and after that is supplied, buyers will require material concessions all round, unless something untoward happens to the American Sea Island crop.

### COTTON PROSPECTS IN THE SEA ISLANDS.

Messrs. Henry W. Frost & Co.'s Sea Island report, of April 13, has the following in regard to the next crop:—

The weather during the week has been unseasonably cold, which has injured such cotton as is up, and retarded very much the germination of the seed recently planted. Consequently, the present outlook is that the crop will have a late and unsatisfactory start.

The report of April 20 states that:—

Replanting has been necessary in many localities, and the planters are having some difficulty in securing proper seed. This may result in some decrease in the acreage previously planted.

### CLEAN, BLACK COTTON SEEDS.

Since the publication of an article on the selection of cotton seed (*Agricultural News*, Vol. VI, p. 118), in which it was pointed out that all clean, black seeds should be discarded in the hand selection, as the lint which is obtained from them is of an inferior quality, the following facts have been obtained:—

Three samples of seed-cotton with clean, black seeds, taken from three separate plants, have been received and examined by this Department, and it has been found that the proportion of weak fibres in these samples is very high.

A good sample of cotton should never contain more than about 27 per cent. of weak fibres, and often samples are found which contain only 19 or 20 per cent.

The samples of seed-cotton with clean, black seeds gave 48·4, 43·7, and 43 per cent., respectively; and when it is remembered that the strength of weak fibres, compared with strong fibres, is only as 1 is to 3 (*West Indian Bulletin*, Vol. VII, p. 163), and that almost all discarded waste in the spinning factory is caused by these fibres, the importance of keeping out seeds bearing a large percentage of weak fibres from those selected for planting purposes is recognized.

### SOIL AND RAINFALL FOR COTTON PRODUCTION.

In the study of plant life, the influence of environment on plant development is fully recognized by both planter and scientist. The temperature and humidity of the atmosphere, the physical character and the chemical composition of the soil, and the character of the rainfall exert influences to which the plant responds. Some plants respond in a satisfactory manner, while on other plants the influences may be of such a nature as to prohibit their successful cultivation.

The requirements of different crops are very varied, and even different varieties of the same plant may require different combinations of conditions.

Sea Island cotton, American Uplands, Egyptian and Peruvian, are all very distinctive. Very different conditions are required for the successful cultivation of each.

The character of the soil is of very great importance in the cultivation of any crop, and should be very carefully considered; while the influence of the physical nature of the soil and the rainfall go, to a great extent, hand in hand.

In the West India Islands, cotton has been grown on almost every variety of soil, ranging from stiff clays to almost pure sand. On these two extreme types, however, the results have not been altogether satisfactory.

Any soil which can be easily worked, except when made up of almost pure sand, will be likely to give good results, provided the rainfall is suitable and the position is such that the land is sheltered from the prevailing winds.

The rainfall likely to give the best results varies between wide limits according to the nature of the soil. With a very porous soil, 80 inches is not too much, and when the soil is very retentive, 30 inches, properly distributed, will be found sufficient to produce a crop. Therefore, in selecting any new land for cotton cultivation, special attention should be paid to the nature of the soil, and to the quantity of rain that falls in the particular district.



## NEP IN COTTON.

At the apex of each cotton seed, there is always to be found a number of flat fibres with extremely thin walls, while the other fibres on the seed have thick walls, and a twisted appearance. These flat, thin-walled fibres are very weak and are differentiated from the good fibres by being called 'weak fibres.'

'Nep' in cotton is caused by the presence of these weak fibres; they curl up and wrap themselves around the good fibres and are seen as white specks when fibres are drawn out of a handful of cotton lint.

Cotton in which much nep is found is 'wasty,' and when the lint is passing through the combing machine in the factory the nep is taken out as waste. This is not all, for the good fibres around which the weak ones have twisted themselves are also taken out with the nep.

In cotton seed selection experiments great importance should be attached to the amount of weak fibres, for the production of a cotton with the lowest possible quantity of such fibres together with other desirable characters should be the aim of all selection experiments.

The proportion of weak fibres varies considerably in the cotton obtained from different plants, and by selecting seed from those which have produced cotton containing the smallest quantity of weak fibres, it is hoped to produce a superior cotton of uniform quality.

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## POTASH MANURES.

The following is abstracted from the Cantor Lectures delivered recently by Mr. A. D. Hall, M.A., Director of the Rothamsted Experimental Station, before the Society of Arts:—

Nearly all potash manures are obtained from the deposits at Stassfurth, Germany. Such of them as contain chlorides are harmful to some soils and crops. Their bad effect can be obviated by applying them some months before the crop is sown. Their potash will be retained in the soil and the chlorine washed out in the drainage water. It has been found at Rothamsted that nearly all the potash applied during fifty years has been removed by crops or remains in the soil. Some may have been washed down to 18 or even to 27 inches deep, but very little has been removed in the drainage waters. If nitrogen or phosphate are lacking in experimental cultures of cereals, the grains are few but perfect, but if potash is wanting, the grains are small and undeveloped. The assimilation process of plants, which includes the manufacture of starch or sugar, is at a standstill in the absence of potash. When a complete manure was applied to grass at Rothamsted for many years, two and a half times as much leguminous herbage was present as in the plot which had received the same manure without potash. On the latter plot the grasses failed to develop seed to any extent, and the haulms or straw of grasses, wheat, and barley were weak and brittle. The wheat, grass and mangel-wurzel on the potash-starved plots were much more attacked by fungus diseases than on those plots which received potash. Potash tends to prolong the season of growth before maturity. Hence its use is most efficacious in a dry season when growth is naturally checked. In ordinary practice, however, it is only on sands and gravels that potash is likely to be deficient, and the ill-effects of its deficiency are intensified by the dryness of these soils. Potash manures on poor soils will be necessary for mangels, potatoes, and grass land. On heavy soils, the use of nitrate of soda will usually liberate enough potash from the clay to supply most crops.

## WEST INDIAN PROSPECTS.

The possibility of closer trade relations between the West Indies and Canada has been brought into prominence through the recent visit of the Canadian Trade Delegation. Not only is there a desire on the part of the West Indies to give Canada as much of their business as possible, but Canada is likewise desirous that methods of improving the present state of commerce between the two portions of the Empire should receive attention.

A brief article in *The Monetary Times*, for April 13, in reviewing the situation, states that Governor Clark, before the Toronto Board of Trade, said that while there is any amount of development to be done in Canada, the only sure method of building up commerce at home is by supplying surplus products to people across the seas; for a nation's foreign trade is recognized as being a true gauge of its commercial stability. To be self-supporting is excellent as a means of bringing the whole world to your service, but to be merely self-contained is to become provincial.

It has been stated by the merchants of the West Indies that where it takes weeks to obtain consignments of goods from the United States, it takes months to get them from Canada. As a result of this, a large proportion of Canadian goods for the West Indies is sent through New York, and therefore counts among American returns. Methods of improving the present state of commerce between the West Indies and Canada will be suggested by the Boards of Trade, whose delegates have just returned home; for this recent delegation has opened up many channels of information which could easily be profitably used by Canadian firms.

The delegates have already sent in brief reports of their mission. These suggest that with a system of reciprocal tariff preferences and with the establishment of better transportation arrangements, a permanent trade can be built up, and show that an effort must be made on the part of Canadians better to appreciate the class and quality of goods that are required in these colonies.

It is hoped that the issue of the joint report will stimulate further action towards the improvement of trade relations between Canada and the West Indies so that some permanent benefit may be derived from the recent delegation.

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## EXPORTS OF SAN DOMINGO.

The report on the trade of San Domingo for the first six months of 1906, published in the *Annual Consular Report*, gives the following information:—

Sugar, cacao, coffee and tobacco were the principal exports, and their invoice value represented 88 per cent. of that of all the products shipped from the republic during the first six months of 1906.

Cacao, as usual, found the largest market in Germany, shipments to that country aggregating 9,602,621 lb., valued at \$638,100, an increase in quantity over consignments during the first half of 1905 of 3,118,635 lb.

Coffee shipments to Germany increased from 356,481 lb. during the period of 1905 under comparison to 1,203,444 lb. during the first half of 1906, valued, respectively, at \$25,164 and \$76,945.

The export of bananas to the United States was increased from 357,000 bunches in 1905 to 434,500 bunches during the first half of 1906.



## EDITORIAL NOTICES.

Letters and matter for publication, as well as all specimens for naming, should be addressed to the Commissioner, Imperial Department of Agriculture, Barbados.

All applications for copies of the 'Agricultural News' should be addressed to the Agents, and not to the Department.

*Local Agents:* Messrs. Bowen & Sons, Bridgetown, Barbados. *London Agents:* Messrs. Dulau & Co., 37, Soho Square, W., and The West India Committee, 15, Seething Lane, E.C. A complete list of Agents will be found on page 3 of the cover.

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# Agricultural News

VOL. VI. SATURDAY, MAY 18, 1907. No. 132.

## NOTES AND COMMENTS.

### Contents of Present Issue.

The editorial (pp. 145-6) contains a brief review of the agricultural prospects in the Leeward Islands, and indicates what efforts have been made to improve the conditions of the several islands.

A short account of the methods, by which the sugar-beet has been improved in sugar contents, is given on p. 147.

References will be found on p. 148 to the establishment of a lime industry in British Guiana.

The attention of manufacturers of concentrated lime juice is drawn to the brief article on p. 149, dealing with the use that can be made of the hydrometer towards ascertaining the strength of their concentrations.

Several notes of interest to cotton growers will be found on pp. 150-1.

A review of the cotton pests of the West India Islands in 1906-7 is given on p. 154, and the attention of all cotton growers is drawn to the article dealing with the danger of keeping old cotton.

An instructive article on the mulching of cacao is given on p. 157.

A number of pedigree animals, the property of the Imperial Department of Agriculture, is offered for sale (p. 159).

### Desirable Qualities of Sea Island Cotton.

It may be of interest to readers of the *Agricultural News* to know what are the qualities of Sea Island cotton which influence the cotton spinner when he is making his purchases.

During his recent visit to the West Indies, Mr. E. Lomas Oliver stated that the most important quality is strength, then comes fineness, and afterwards length. The cotton must necessarily be clean, uniform, and have a natural twist.

By natural twist is meant the twisting of fibres around one another when lying close together, giving more or less the appearance of a cord.

### Coffee in South Africa.

Several attempts have been made to establish coffee in South Africa, but the reports on the experimental plots have been far from encouraging.

Arabian coffee seed was distributed in 1903 by the Agricultural Department in those parts of Cape Colony where it was most likely to be suited to climatic conditions, and it would appear that plants are thriving and bearing well in the Transkei.

The latest results would indicate that there is a possibility of growing coffee in some districts of South Africa; but it is stated in the *Agricultural Journal* of the Cape of Good Hope for March, that the conditions that are essential to the successful prosecution of the industry on a commercial scale are not altogether favourable.

### Sugar-cane Experiments in the Leeward Islands.

The first part of the official report on the sugar-cane experiments carried out at Antigua and St. Kitt's during the year 1905-6 has just been published. It contains the results of the experiments with forty-five varieties of sugar-cane, mostly seedlings, conducted on eight estates in each island. At Antigua, in the experiments with plant canes during the season, the results show that the canes B. 156, D. 109, Sealy Seedling, and B. 208 stand out as specially worthy of attention; while in the ratoons D. 109, Sealy Seedling, and B. 156 have given the best results. These canes gave good results during the two seasons prior to 1905-6, and therefore can now be recommended for extended trials at the hands of planters.

At St. Kitt's, B. 254, and B. 208 head the list as plant canes, and as ratoons D. 95, D. 74 and the White Transparent have given the best results. B. 208 heads the list of averages for six years and is proving to be a very satisfactory cane, deserving of extended trials.

The appendix refers to the recent inquiry that has been made into the amount of cane disease in Antigua, from which it is gathered that the leading planters are of opinion that their canes at the present time are comparatively free from disease, and that, on the whole, the amount of disease is less than it was during the past five years. A summary of the results of the experiments, detailed information of which is given in the above report, has been issued as Pamphlet No. 46 of this Department.



### Cacao in Jamaica.

Reference was made in a previous number of the *Agricultural News* (Vol. VI, p. 41) to the exportation of cacao from Jamaica in 1905-6. The total export was 32,587 cwt., an increase of more than 10,000 cwt. over the previous year's output.

It is now reported that the export of cacao from Jamaica for the year 1906-7 is estimated at about 41,000 cwt., thus showing a satisfactory increase.

There are many districts in Jamaica that should prove suitable to the cultivation of cacao, and the *Journal* of the Jamaica Agricultural Society urges that more attention should be given to its cultivation. The value of complete drainage is becoming more generally recognized and mulching should now receive considerable attention at the hands of every cacao planter.

### Rubber in British Guiana.

In order to assist the rubber industry of British Guiana, a rubber experiment station is being established. Mr. R. Ward, Agricultural Assistant, is at present engaged choosing a site and making the preliminary arrangements for its establishment.

It is anticipated that species of *Sapium*, that are indigenous to the colony, will probably suit best, and a large number of seeds have been germinated at the Botanic Gardens. These plants will be sent to the station when it is established.

The Para rubber tree (*Hevea brasiliensis*) is not known to occur in British Guiana, but many other rubber trees are plentiful, of which *Sapium Jenmanii* is said to yield commercial rubber.

### Prizes in Agricultural Schools.

In the last number of the *Agricultural News* a brief review was given of the agricultural schools at St. Vincent, Dominica, and St. Lucia, where practical training in Agricultural Science is being given to a selected number of boys of those islands in order to instruct them as to the best methods of dealing with the staple crops and their pests.

Half-yearly examinations are conducted through this office on the work of the school. The papers set are made as similar as possible, and particular attention is paid to setting questions dealing with conditions of local crops. The comparison of the answers from the different schools is particularly interesting, and, therefore, a scheme of prizes has been adopted, whereby it is hoped that every boy will endeavour to do justice not only to himself, but also to his school and teaching. A prize is offered for competition between all the senior boys of the three schools, and another prize is offered to each school for the best junior pupil.

Other prizes will be awarded annually on the work in the field and in the school gardens, and it is hoped, thereby, to stimulate interest in agricultural practice. Marks for these prizes are awarded by the resident masters-in-charge of the schools. These will be added up at the end of each year.

### The Association of Economic Biologists.

This association was organized in 1904 to promote and advance the science of economic biology in its agricultural, horticultural, medical, and commercial aspects.

A summary of the Cambridge meeting, in 1907, is given in the *New Phytologist* for January, and it mentions what problems in economic biology came up for discussion.

The papers submitted included the work on cereal breeding conducted by the Cambridge University Department of Agriculture, in which a clear exposition of the Mendelian laws of heredity was given; whilst the discussion on a fungus disease of the gooseberry, that is now invading Europe, brought forward the question whether legislative action for its suppression would be advisable. The paper on the geographical distribution of the principal rubber-yielding plants gave a summary of the present position of rubber production and indicated the complexity of the factors controlling the introduction and cultivation of these plants in new countries.

The meeting of biologists interested in various branches to discuss matters of mutual interest is likely always to be productive of valuable results, and the full account of the meeting will be looked for with interest.

### Agriculture in Spanish Honduras.

The following is extracted from the *Annual Consular Report*, and gives a summary of agriculture in Spanish Honduras for 1905-6:—

The crops in the year 1905-6 have been abundant, and the maize, which forms the principal food of the people, has been as cheap as it was ever known to be.

Bananas are the only product of the soil developed to any great extent, the other vegetable products not showing a very important increase in any case.

There is some apprehension as to the result of the coming banana season, as the United Fruit Company, hitherto the principal buyer, has announced that their steamers will cease to take fruit from Puerto Cortes. The difficulty has arisen from a question with the planters as to prices, and although other steamer lines may send their boats, it is feared that the result may be a check to the advance of the trade in that region.

Many parts of Honduras are very suitable for the cultivation of the sugar-cane; but so far the planters use their crop almost entirely for the manufacture of the supply of rum required for the Government liquor monopoly.

There is no reason why Honduras should not be as successful in producing sugar for export as its neighbours Nicaragua and Salvador, for many of the most suitable districts for this industry are within easy reach of the coasts, and it is hoped that some attention may be given by planters to this matter before long.

In spite of the attraction rubber planting now has for other countries of similar climates, no serious attempt has been made to cultivate it in Honduras. The small amount of rubber exported is principally from wild trees, which are tapped without the necessary care.





## INSECT NOTES.

### Cotton Pests in 1906-7.

During the season of 1906-7, the insects attacking cotton in the West Indies have been much the same in each island as in previous seasons.

The most notable exception to this general statement is to be found in St. Vincent, where the cotton worm (*Aletia argillacea*) made its appearance for the first time since the revival of the cotton industry. This appearance was not in the form of a serious attack, but it will serve to give warning to cotton planters in St. Vincent that the insect is in their midst and that precautions will have to be taken to prevent its becoming a pest next season.

In other West India Islands the cotton worm was seriously abundant during the past season. Large quantities of Paris green were used by cotton growers in combating the cotton worm in all the islands. In Montserrat, London purple was tried on a large scale and good results have been reported. Much remains yet to be done in improving the method of applying poisons to the cotton plants for the control of the cotton worm. It has been proved repeatedly that Paris green can be applied economically by means of the cloth bag (ticklingburg), the Acme powder bellows, or the Champion powder gun. When applied in due season, by means of any of these, 1 to 1½ lb. Paris green with 6 to 9 lb. lime per acre have been found sufficient for a thorough application. The use of large amounts of Paris green in a single application always means waste—increased cost without added benefit.

The leaf-blister mite of cotton has been prevalent in all the cotton-growing islands except Barbados, where it has not yet made its appearance. In every instance that has come under observation, the thorough destruction of old and infested cotton some time before the planting of the new crop has resulted in less damage by the leaf-blister mite, while, on the other hand, young cotton growing near fields of old abandoned cotton infested with this pest has always been much more seriously attacked.

Cut worms have been reported in several instances as damaging young seedling cotton, but the use of the poison bait of 50 lb. bran or pollard, 1 lb. Paris green, and stirred to a thick mash with molasses and water, has given entire satisfaction in controlling these pests. The same remedy would probably give equally good results if used to control attacks of grasshoppers and field crickets such as were experienced during the past season in Nevis.

The corn-ear worm (*Laphygma frugiperda*) has occurred in Barbados boring in the growing bolls, but not in sufficiently large numbers to be considered a serious pest. Hand-picking of the infested bolls has been practised as a control measure.

The cotton-boll worm (*Heliothis armiger*) has made its appearance in Antigua and Barbuda, but has not become seriously prevalent.

During the past season, clusters of insect eggs were observed on leaves of cotton in Barbados. These proved to be eggs of a small moth (*Caradrina spilomela*), closely related to the corn-ear worm. This insect is a native of the tropics and has long been known in the West Indies. It is not

likely to prove a serious pest so long as it feeds on the cotton leaves, as the remedies adopted for the control of the cotton worm would be equally effective for this insect.

Scale insects, red maggot, and plant lice have been abundant on certain estates, and have been the cause of more or less serious injury.

The black or Hibiscus scale (*Lecanium nigrum*) has been the most serious scale insect pest on cotton in Barbados. It is noticeable in the case of this insect and the red maggot that the same estates do not suffer severely in successive years from their attacks.

### Old Cotton and Cotton Pests.

For several years past it has been the custom of the Imperial Department of Agriculture to call attention to the danger of keeping old cotton on the land after the season has arrived for planting the new crop.

Each planter must decide for himself how late in the year he can afford to keep his old crop going, but he should be aware of the risk he incurs under certain circumstances.

The experience of cotton planters in Barbados with black scale, and in other islands with the leaf-blister mite, clearly indicates that negligence in destroying old cotton may result in very considerable losses in the following crop.

Readers of the *Agricultural News* may remember the instance given (Vol. V, p. 42) of a field of old cotton badly infested by scale insects which was allowed to remain until after the adjoining fields were planted with cotton for the new crop. The old cotton gave practically no returns after the planting of the new crop, and in addition both of the adjoining fields of young cotton were complete failures owing to the serious infestation of black scale from the old plants.

This experience is paralleled by that of planters in other islands where the leaf-blister mite is prevalent. In one instance, a field of cotton was kept until late in the year, because it gave promise of further bearing. The promise was not fulfilled; practically no additional cotton was obtained, and the following crop in adjoining fields suffered from serious attacks of the leaf-blister mite. In other localities fields of old cotton were abandoned and allowed to serve as sowers of infestation to new cultivations, with the result that all the neighbouring cotton in the following crop was very badly infested.

These are practical illustrations of what may follow indifference or carelessness in the matter of destroying old cotton before the new crop is planted, and it will be well for every planter to consider carefully what the risks are, and then to decide whether he will assume them.

The matter has however another and more serious aspect. It sometimes happens that the owner of the old cotton is not the one to suffer loss in the succeeding crop. He may not decide to plant cotton near the source of infestation while his neighbour may wish to use adjoining fields and may be occasioned severe loss by the negligence of others.

In addition to considering the probability of infestation from old cotton fields, it would be well for planters to assure themselves as far as possible against infestation from other sources. Hibiscus trees and hedges frequently harbour black scale, and wild cotton may be infested by the leaf-blister mite. Steps should be taken to have all such plants destroyed in the vicinity of cotton cultivations.

In the case of the red maggot it has not been so conclusively proven that serious infestation comes to young cotton from old fields, but it would seem that the chances are greatly increased, and that it would be well worth while to eliminate this possibility.



## SCIENCE NOTES.

## Eddo and Tannia.

The eddo of the West Indies (*Colocasia antiquorum*) is called coco in Jamaica and taro in the Pacific Islands. The species was introduced from the East Indies. It may be distinguished by having the leaf-stalks affixed to the blade some distance inwards from the margin. The plant is shown



FIG. 14. EDDO OR TARO.

in fig. 14. The tannias are aroids, natives of tropical America, and were cultivated by the Caribs. They are species of *Xanthosoma*, and have the leaf-stalk continuous with the margin of the blade.

## The Mahogany.

The West Indian mahogany (*Swietenia Mahagoni*, L.), is a tall tree with ascending branches, on which are borne alternate pinnate leaves with four or five pairs of unequal-sided, pointed leaflets, each about 2 inches long, and small, dry leaf-buds surrounded by scale leaves.

The flowers are small and greenish-yellow, and appear about March in axillary stalked panicles. Each flower has a small cup-shaped calyx; five petals twisted in the bud; a wide, staminal tube with ten teeth alternating with the ten anthers; and a five-celled ovary. As a rule, only one flower of the panicle becomes a full-grown fruit.

The fruit or seed-vessel is a rough, brown, woody capsule, ovoid and slightly five-lobed, 3 to 4 inches long, and is often carried erect. When it is ripe, the thick wall splits opposite the septa into five thick valves which separate, commencing at the stem end. Each cell encloses twelve or more winged seeds about 2 inches long, arranged in two rows, and attached by the tips of the wings. The wing of each seed is twisted, so that when the seed falls it rotates rapidly, its fall thus being retarded (*Agricultural News*, Vol. V, p. 365). The wood of the mahogany is reddish-brown and hard, but not heavy, and is often used in the West Indies for ship and boat building. The pores are fine and the rays even and numerous. From wounds in the tree, a gum which dissolves in water exudes, and this can be employed as a substitute for gum arabic. In

Barbados, where the mahogany tree is abundant, the fallen valves and cores of the fruits are collected and used for fuel.

In commerce, the name mahogany is applied to various reddish-brown timbers from trees of the order *Meliaceae*, and is by no means confined to the woods of the three known species of *Swietenia*. The African mahogany is said to be derived from *Khaya senegalensis*, the Australian from *Dysoxylum Fraserianum*, the Indian from *Cedrela Toona*, etc.

With reference to West Indian mahoganies, Mr. Herbert Stone, F.L.S., in his book on *The Timbers of Commerce*, says:—

I lean to the view that most if not all of the mahoganies commonly met with are Cedrelas. . . . The only conclusion I can draw therefore is that our commercial mahoganies are not the wood of *Swietenia*, and in this I am supported by the want of resemblance in the structure of the specimens at Kew to our common mahoganies. The chief difficulty is the doubtful authenticity of specimens derived from commercial sources.

To clear up the doubt, small specimens of the woods of the various West Indian trees locally known as mahoganies are needed, accompanied by leaves, seed-vessels, and flowers from the same trees.

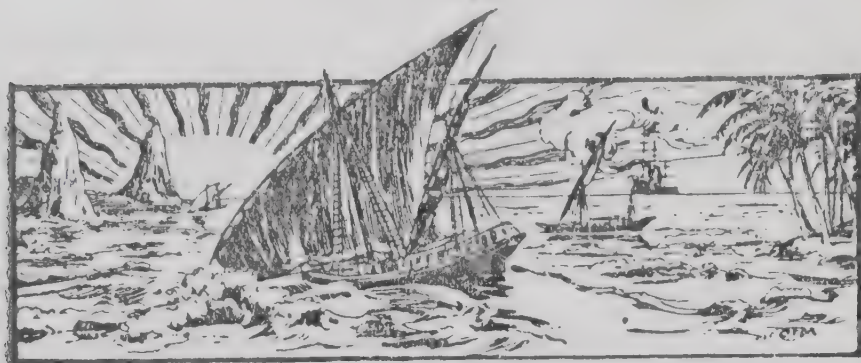
## INTERNATIONAL CONFERENCE ON GENETICS.

The issue of the *Report of the Third International Conference on Genetics* (the study of the physiology of Descent), which was held under the auspices of the Royal Horticultural Society in London, in July and August of last year, will be welcomed by all interested in hybridization, variation, cross-breeding, and in the application of the theory of heredity to the practical problems of breeding.

The contents of the volume are particularly interesting, and it safely may be stated to be one of the most valuable reports that have been issued of late, for it affords up-to-date information in respect to scientific experiments in hybridization, and indicates the methods that are likely to prove beneficial in the grappling of difficult cross-breeding problems. In fact, to quote from the presidential address, 'the study of hybridization and plant breeding, from being a speculative pastime to be pursued without apparatus or technical equipment in the hope that something would turn up, has become a developed science.'

Many of the papers are of a scientific nature, and are extremely valuable, as they afford information that can be utilized with benefit in practice. There are other communications, however, that indicate the manner in which improved varieties of plants, suitable for different conditions or for varied purposes may be, and are being, obtained. Such papers as those communicated by Professor Zavitz, Mr. Biffen, and Mr. de Vilmorin, on the breeding of cereals, and by Sir Daniel Morris, K.C.M.G., and Mr. F. A. Stockdale, on the improvement of the sugar-cane by selection and hybridization indicate that systematic work of a practical value is being carried on, and that definite results are being obtained. The address by Dr. Erwin Smith on 'Plant Breeding in the United States Department of Agriculture' briefly reviews the excellent work that has been carried out with cotton, maize, and other plants, in breeding for resistance to disease, for resistance to cold, and for greater productivity; and the paper by Professor E. S. Salmon on 'Raising strains of plants resistant to fungus disease,' points clearly to the existence of different 'constitutional' characters in different plants in respect to fungus diseases.





## GLEANINGS.

It is officially announced that the Governor of Jamaica has appointed Mr. C. Watson, late of Montserrat, to be a member of the Board of Agriculture in the place of Mr. J. W. Middleton, deceased.

It is reported that the New Colonial Company's Usine, St. Madeleine, in Trinidad, has manufactured recently 1,000 tons of sugar in a single week, and it is expected that their total crop is likely to be between 12,500 and 13,000 tons this season.

The St. Vincent *Sentry* for April 19 last, says: 'The cotton yield for the present crop has largely exceeded the estimate, as already over 650 bales of Sea Island cotton have been ginned or are in sight. A record shipment of over 100 bales went off in the last Royal Mail steamer.'

During a dry spring in Texas, the prickly-pear cacti have supplied nectar and pollen for the bees when no other flowers were open in sufficient numbers. The honey thus produced is said to be of too coarse a flavour for sale, but is useful as bee food. (*Gleanings in Bee Culture*, April 1907.)

There was a slight decrease in the number of pines exported from the Azores in 1906 as compared with the year 1905, viz., 1,281,437 pines as against 1,307,233. The heavy fall in the exchange has greatly affected the cultivators of pines, the margin of profit in this industry being now a very meagre one. (*Annual Consular Report*.)

It is gratifying to note that most of the Governments of the West India Islands have made grants towards sending representative exhibits to the forthcoming Canadian Exhibitions, and in some of the islands the Permanent Exhibition Committees are already commencing to take the matter in hand.

Consul J. A. Howells, of Turks Island, reports that 1,564,300 bushels of salt were raked during the season 1906, a great improvement over the discouraging seasons of 1904 and 1905. The disastrous rain of November 4 last, however, resulted in the loss of 15 to 20 per cent. of the salt piled on the beach for shipment. (*U. S. Monthly Consular Reports*, March.)

The *Philippine Journal of Science*, for December 1906, has a brief note on the alkaloids from *Datura fastuosa*, var. *alba*, a plant distributed throughout the tropics. The alkaloids contained in it are 90 per cent. hyoscin, which can easily be detected in toxicological work, as it is extremely soluble in ether. The symptoms following on ingestion are dilation of the pupil, drowsiness and general weakness, often accompanied by hallucination.

Rules have been approved in connexion with the scheme for providing agricultural scholarships for lads in the elementary schools of British Guiana, who show a desire to advance beyond the agricultural instruction imparted to them at such schools. The boys will be stationed at the Orphan Asylum and paid a certain rate of wages per diem, part of which will be deducted for board and lodging, and the balance placed to their credit in the Savings Bank. (*The Daily Argosy*, April 12.)

Consul W. W. Handley, of Trinidad, writes that the rise in the price of cacao is stimulating interest in the cultivation of that crop. The selling price of cacao is just at present much higher than it has been for many years, the reason being that the production is not by any means keeping pace with the increasing consumption; and in view of the present boom in rubber, planters in tropical countries are now planting rubber on much land which would otherwise have been planted in cacao. (*U. S. Monthly Consular Reports*, March.)

The export of raw rubber from Madagascar has shown considerable development during the past three years and the amount exported in 1905 was 904 tons. No systematic effort has yet been made in Madagascar to cultivate rubber, all the rubber hitherto exported having been collected and prepared by natives. Experiments are now being made with the object of growing from cuttings the more productive of the rubber trees indigenous to the country. (*Tropical Agriculturist*, March 1907.)

The *Hawaiian Forester and Agriculturist* for December 1906, refers to an experiment in Hawaii, in which mangos were dried in the sun in the same way as prunes are dried. The dried mangos were exhibited at the last Farmers' Institute meeting, and met with very general favour. It is thought that there will be a ready market for them in the western United States. Where there is an excess of mangos, as in Hawaii, or in Jamaica in the West Indies, this method of preserving the fruit for export may perhaps be profitable, and therefore should receive attention.

The native Hawaiian forests are preserved on all the important watersheds by the government of the territory in order to conserve a constant water supply for the various irrigation and power development systems. The perpetuation of the forest cover is held to be the only means by which the streams of Hawaii can be maintained and their flow kept relatively constant. There are now twelve forest reserves, enclosing 337,147 acres, under the charge of forest rangers, district foresters and wardens, and it is proposed to establish other forest reserves as soon as the necessary surveys have been completed. (Third Report of the Board of Commissioners of Agriculture and Forestry, Hawaii.)

Bamboo has long been the chief material in use for paper making in China. The length of fibre, softness, and whiteness of bamboo pulp for paper are equal to these same qualities in the best cotton pulp. Experiments of the Philippine Bureau of Science have shown that paper pulp is easily prepared from mature bamboo stems. They need previous crushing between fluted rollers. They do not require more alkali to reduce them to pulp than is used for esparto grass or straw, and less than is needed for making wood pulp. The dwarf bamboo of the Philippines (*Bambusa Lamampao*) required less bleaching agent and produced a whiter pulp than the large bamboo (*B. Blumeana*). (*Philippine Journal of Science*, December 1906.)



## MULCHING CACAO.

In a previous number of the *Agricultural News* (Vol. V, p. 389), mention was made of the value of mulching in dry weather as a means of conserving soil moisture, and reference was made to the excellent results obtained at Dominica by mulching cacao with grass and leaves, as reported in the *Dominica Botanic Station Report* for 1905-6, and in the *West Indian Bulletin* (Vol. VII, p. 204).

From these experiments, it is gathered that the value of this mulching depends largely upon increasing the humus in the soil, which in the tropics rapidly tends to disappear, and therefore the following points, forwarded by Dr. Francis Watts in reply to a series of questions addressed to him concerning the manner in which mulching of cacao should be carried out, may be of general interest to cacao planters.

Dr. Watts states that:—

It would not appear to be of importance whether the grass is fresh or partially dried, and it is doubtful whether it would be worth while to 'chop up' coarse, long grass, such as is obtainable from waste lands and neglected pastures, before applying it as a mulch. In reference to 'chopping,' however, the rate of rotting might be hastened, and therefore, while not recommending it for practice at present, comparative experiments might be tried, if facilities existed.

'Bush' may be used as well as grass, but it is advisable that any useless or troublesome sticks be removed by hand a short time after it has been applied. Leaves and stems of bananas make a good mulch. The last should be chopped up to assist rotting, and should be used with grass and bush.

The mulch should be spread over the surface irrespective of the presence of any leaves of cacao or flowers of immortels and should not be brought nearer the stem of the tree than about 18 inches, and it is to be recommended that it should be covered with a thin layer of soil, such as would be obtained from the clearing of trenches or from other similar operation, if this be available, as this covering will assist in rotting the mulch and will prevent 'wash.'

The time of application of the mulch is not important, and it should be done at any season when the general operations of the estate permit of it being done. Pressure of work should not be an excuse for not mulching.

Lime is a useful and necessary application for sour cacao soils, but it is not a substitute for mulching, though it has a somewhat similar effect in rendering the soil more porous. Liming and mulching may be practised in the same field; lime first and then mulch.

The foregoing remarks apply more particularly to established cacao fields where the trees fairly cover the ground. In young fields, attention must be given to the soil in the open spaces between the trees.

In many instances, mulching with grass and weeds will constitute sufficient cultivation; where it does not, the soil should be carefully forked, and the weeds lightly buried. The planter must use his skill and judgement in dealing with the soil, but in every case he should regard the weeds growing between the trees as a green dressing, and should find that by careful mulching the texture and tilth of the soil may be maintained without any extensive forking or tillage operations.

## RICE INDUSTRY IN HAWAII.

The *Hawaiian Forester and Agriculturist* for March, in an article calculated to stimulate the raising of rice in Hawaii for home consumption, gives a brief summary of the efforts that are being made to develop a rice suited to local conditions of soil and cultivation. The following has been extracted:—

Hitherto, the cultivation of rice in this country has been in the hands of growers who have been contented with primitive methods. A general depletion of rice lands has consequently taken place; and at the same time, the seed used has become greatly impoverished. A close observation of a rice field will reveal many empty stalks and many areas within which seed has not germinated. The length of growth, too, will be seen to vary very considerably, and much stunted rice will be noticeable. Besides these disadvantages, the fields will be found to be invaded by an innumerable host of grasshoppers, chiefly confined to the edges of the fields, which levy as large a toll upon the ears as the persistent rice-bird. Together with the solution of the above difficulties, the experiments will aim at evolving a rice possessing superior cultural, yielding, milling, and culinary properties.

About 130 varieties are being examined in the trial beds, received from trained agricultural explorers of the U. S. Department of Agriculture, who have for this purpose together investigated the rices of all the producing countries of the world. The various rices now being experimented with afford every diversity of growth and period of maturity. One promising sample from China, possessing the typical short kernel of the Japanese rices, ripens in seventy days. Other varieties show no sign of flowering 100 days after planting. The rice beds show every stage of condition and maturity. Some samples are 10 feet high and others quite low. Some are leafy and others possess almost bare stalks. Some varieties are sturdy and others show a tendency to droop.

The plant breeder proceeds in this work with as much method and precaution as the breeder of stock. He has, however, these advantages in his favour: the greater number of individual members to experiment with, and the greatly reduced period of generation. Having decided upon the superior merits of a particular variety, he, with infinite care, generally based upon elimination of individuals, selects three of his best plants. The potential yield of each of them is then exactly determined per acre, and the heaviest producer is then reserved as the mother plant from which all future rice of that variety will be grown. In this manner a pure stock of known parentage is determined.

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## DEPARTMENT NEWS.

The Imperial Commissioner of Agriculture has returned from a tour in the Leeward Islands extending from April 14 to May 10. It is probable he will remain at the Head Office until the end of the first week in June next.

Mr. W. R. Buttenshaw, M.A., B.Sc., who has been Scientific Assistant on the Staff of the Imperial Department of Agriculture since July 14, 1903, embarked in the R.M.S. 'Atrato' on May 2 to take up an appointment under the Government of India. Mr. Buttenshaw carries with him the best wishes of his colleagues. His future career in India will be followed with great interest by his many friends in the West Indies.



## CULTIVATION OF RUBBER.

The following extracts have been made from an address given by Mr. Herbert Wright, A.R.C.S., formerly Controller of Experiment Stations, Ceylon, before the Liverpool Institute of Commercial Research, on the plantation rubber industry in the East:—

The plantation rubber industry in the East is one of the most remarkable developments that has been chronicled in recent times. Ten years ago, though the botanic and forest departments in Singapore, Ceylon and India then possessed twenty-year-old trees of *Hevea brasiliensis*, or Para rubber, the planting community and the investing public would not seriously consider the question of cultivating rubber trees. But to-day in the Indo-Malayan region alone, there are nearly one-quarter million acres of land planted with, or prepared for, rubber trees. In a few years Ceylon alone may be expected to send from 5,000 to 7,000 tons of rubber annually, and the Indo-Malayan region can promise ultimately to supply more than the whole of Africa exported in the year 1906. In the East there has been more land planted with, or bought for, rubber trees during the last two years than in the previous twenty years, and the diverse conditions under which the various rubber-yielding species can be profitably grown will allow of extensive cultivation in the near future.

Many mistakes have undoubtedly been made in the past owing to our ignorance of the real caoutchouc-yielding capacity of certain species of trees and vines in the tropical forests of Africa and America; errors in planting have been frequent owing to the absence of reliable information regarding the essential soil and climatic conditions for each species, and successive methods of latex extraction and rubber curing have been evolved, adopted, and, fortunately, forgotten. The cultivation of rubber-producing plants in all parts of the world, the exploitation of areas possessing indigenous rubber species, the collecting of the latex, the manufacture of rubber, and seed selection and plant sanitation operations on rubber estates are now rapidly developing along scientific lines.

Many people do not view the plantation rubber industry in a very serious light at the present time, but it is as well to repeat that the rise in exports of plantation rubber in a few years will be as sharp and conspicuous as has been that of the planting of rubber trees, and for this we should be prepared. It will be remarkable for its constancy and purity, the minimum yearly output will be guaranteed, and with good management the quality should improve year by year.

The only other tropical territory in the British Empire which can be regarded as a reliable source of rubber is Africa. The rubber plants in the African regions are widely distributed, and have been recorded from so far south as Natal, 28° from the equator. The rubber species abounding there differ from those in the tropical American region, and also from those on the planted areas in the Indo-Malayan region, in so far that they are largely of the climbing type. There are, however, signs that the rubber from Africa will soon show an intermingling of characters, and it may be expected, sooner or later, to partake of certain tropical American features. The exploitation of tree forms indigenous to various parts of Africa, and the planting of similar kinds introduced from America and the East, will soon have an effect on the character of the exported material from African ports.

In the cultivation of caoutchouc-yielding plants, our eastern possessions have led the way, and it is to the credit of the Indian Government and Kew that such good results have been rendered possible with species from regions so distant as West Africa, the Amazon Valley, the State of Ceara, and

Mexico. The rapid development of the rubber industry in Ceylon was remarkable, the plantations having increased from 600 acres in 1896 to over 100,000 acres at the present time.

The following extracts from a paper by Dr. Olsson-Seffer, of the La Zacualpa Botanic Station, Mexico, in the *Agricultural Bulletin* of the Straits and Federated Malay States, give information respecting rubber cultivation in Mexico and Central America:—

Throughout the Central American republics, very little has as yet been done towards planting rubber. In most of these countries, there is a great unstability of government, and foreign capital is not attracted under such conditions. Labour conditions are also very unsatisfactory on account of the frequent revolutionary movements, which sporadically crop up and draw the greater part of the able-bodied men to the ranks either of government or rebel armies. Transportation also offers a serious drawback, and many prospective planters are deterred from settling because of the reported unhealthfulness of the climate.

In Central America there is plenty of land suitable for rubber planting. A year ago I rode for days through good rubber country in Guatemala. In this latter republic very little planting of rubber has so far been done. In Northern Guatemala, there is only one plantation of any account devoted to rubber. In the other Central American States, rubber cultivation has been commenced on a small scale. In Nicaragua, there are a number of plantations. In Panama, rubber is being planted; in Costa Rica, there are a few young plantations; and in Honduras, rubber has been planted as shade for cacao. In San Salvador, some rubber has recently been planted. Altogether, there are in the Central American Republics, as far as I know, about 12,230 acres under rubber.

During the year 1904, the first attempts at collecting latex from cultivated trees were made in Nicaragua. These experimental tappings were made on a plantation about 30 miles north of Bluefields in the Pearl Lagoon district. The trees tapped were raised in a nursery in 1897, transplanted in 1898, and in 1904, at an age of seven years, they measured 17 to 30 inches in girth and 40 to 45 feet in height. Of the 6,000 trees that were tapped, the largest received three incisions, the medium-sized two incisions, and the small ones only one. The average amount of rubber per tree was 1½ oz.

Less than ten years ago American capital was attracted towards rubber planting in Mexico. As a result of this movement there are to-day, approximately, 100 plantations entirely or partly devoted to rubber. I have in my possession letters and data showing that the whole area under rubber in Mexico to-day (December 1, 1906) is at least 82,620 acres. I think it is safe to say 90,000 acres. Next year's planting, at a low estimate, should be not less than 10,000 acres.

In the West Indies attention has been paid to the cultivation of the Central American rubber (*Castilloa elastica*), particularly as shade for cacao, and the West African (*Funtumia elastica*), but there is also a demand for seeds and plants of Para rubber (*Hevea brasiliensis*). Seeds of the last named have been imported for St. Lucia, Dominica, Grenada, and Trinidad. There is no doubt that Trinidad, Tobago, St. Lucia, Dominica, Grenada, and Jamaica are well adapted to the cultivation of rubber trees, while large tracts of land in British Guiana might also be planted up.



## THE CULTURE OF DIVI-DIVI.

The following notes are abstracted from a paper recently read by Mr. W. Versluys before the Curaçoa Agricultural Society:—

The cultivation of divi-divi (*Caesalpinia coriaria*) is of the greatest importance to Curaçoa and to the two neighbouring islands.

The seeds should be taken only from trees which yield heavy crops of pods. The pods are ripe when the seeds can be heard to rattle in them. Fully ripe pods, which do not show any perforations of boring insects, are crushed up and winnowed in the wind to separate the fragments of husks from the seeds. The seeds may then be put in water in order to separate the heavy from the light. Those that sink are dried and are ready for immediate sowing.

Seeds sown in baskets this year germinated usually in five or six days, when kept moist. The seedlings should be well and regularly cared for, and will be ready for planting out in the open ground in about five months after germination. The holes should be prepared before planting, about 10 lb. of goat manure being put to each hole. A distance of about 16 feet between each plant every way will allow of maize being grown between. This lessens the cost of the first year's work, keeps the ground clear of weeds, shades the soil, and causes the young trees to grow straight. Any loss of plant food caused by the growth of the maize can be replaced by manuring. Starting with plants 16 feet apart, in a few years they will have grown so large that half of them must be cut out, alternately in each row. Some years later when the trees have grown so as to fill the gaps, every alternate row must be cut out and the remaining trees will be 32 feet apart. The cost of cutting out the trees is covered by their value for wood or charcoal.

Before planting out it must be decided whether one plant or more are to be put in each hole. Many planters prefer three stems to one, as they are more able to withstand the force of the wind when young. The same result may be attained by propping the single trees. The three stems, however, quickly form a strong root system and the crown of foliage quickly spreads to a large size. They also seem to give off lateral branches nearer the ground than when grown singly, and this facilitates picking the pods; but unless goats are kept off, these animals destroy the low branches. Single trees may be made to branch at a low level by topping them.

A plantation of divi-divi may be made by sowing the seeds directly in the field. But the method of sowing first in baskets is better in the long run, though more expensive at first.

The divi-divi grows well in Curaçoa on the fine black soil of the wide valleys; but when the valleys are dammed so as to hold back the water, this soil becomes too moist, the trees grow very tall, and the number of pods is lessened. The lowest slopes of the mountains seem best suited for growing divi-divi. On the calcareous soils, there are very few well-grown divi-divi trees.

A slight pruning may be useful for trees which regularly bear fair crops, and may consist in the cutting out of dead branches; but the natural wind screen of branches on the eastern side must be preserved.

The weight of pods from one divi-divi tree in Curaçoa may be from 40 lb. to 80 lb. annually. Only fully ripe pods, picked from the tree, should be shipped as first quality, and all fallen pods should be classed as second quality.

In islands where there is a heavy rainfall the divi-divi does not seem to bear well. It is evidently suited to places, which, like Curaçoa, have a low rainfall.

## BREEDING CATTLE FOR BEEF.

The breeding of cattle for beef has been carried out experimentally at Trinidad by Mr. C. W. Meaden, Manager of the Government Stock Farm, and from the results recently published, the following abstract has been made, as it may be of interest to West Indian planters:—

The first experiment in this direction was carried out at St. Clair, and was apparently successful. The experiment was continued at Valsayn, and seems to have been even more successful than that at St. Clair. The animals dealt with were cross-bred, red polls—sire imported red poll, cows part bred Zebu. This combination has been satisfactory, the character of the red poll breed being predominant in the offspring. This breed of cattle has the character, in those countries where they are bred, of being among the most useful all-round cattle; they are good milkers, very hardy, and little affected by heat and flies. They make excellent butchers' beasts, requiring much less fattening than most other breeds, and therefore cost less to rear. Being destitute of horns, a great deal of trouble is saved to milkers, shippers and others handling them.

The general characters of the breed have been maintained in Trinidad, though, of course, considerable time must be allowed to elapse before this is ascertained with absolute certainty; but it is quite safe to assert that the breed is well adapted and suitable to our conditions, and fully bears out the description for usefulness which it has gained in its native home. With the red poll and the assistance of the Zebu, a breed of cattle might be founded which would possess qualities of high merit such as are claimed for particular breeds elsewhere.

## IMPERIAL DEPARTMENT OF AGRICULTURE.

### Sale of Pedigree Stock.

The following animals, the property of the Imperial Department of Agriculture for the West Indies, are offered for sale:—

One *Devon Bull*, now at Montserrat; about three years old; purchased from the Royal Farms, Windsor, in 1904. Original cost, £40; offered for £25.

One *Hereford Bull*, imported from Canada in 1902; about seven years old; now at Montserrat. Original cost, £35; offered for £15.

One *Berkshire Boar*, now at Montserrat; not quite four years old; imported from the Royal Farms, Windsor, in 1904; original cost, £8; offered for £4.

One fine *Ayrshire Bull*, 'Stamp 3rd.' now at St. Kitt's; four years old; imported from Canada in January 1907. Original cost, £25; offered for £20.

The animals may be seen and examined in the several islands named, on application to the local officer of the Department of Agriculture. They are all believed to be in sound condition, but the Department is not prepared to incur any responsibility on this point. In cases where any of the animals may be required to be shipped to another island, the actual expenses incurred would require to be paid in addition to the prices above stated. Offers may be forwarded to:—The Imperial Commissioner of Agriculture for the West Indies, Head Office, Barbados.



## MARKET REPORTS.

London,—April 23, 1907. 'THE WEST INDIA COMMITTEE CIRCULAR,' Messrs. KEARTON, PIPER & Co.; Messrs. E. A. DE PASS & Co., April 19, 1907; 'THE LIVERPOOL COTTON ASSOCIATION WEEKLY CIRCULAR,' April 19, 1907.

ARROWROOT—St. Vincent, 2½d. to 2¾d. per lb.  
BALATA—Sheet, 2/3 to 2/7; block, 1/10 to 1/10½ per lb.  
BEES'-WAX—£7 7s. 6d. to £7 17s. 6d. per cwt.  
CACAO—Trinidad, 86/- to 92/- per cwt.; Grenada, 78/- to 83/- per cwt.  
CHILLIES—Dark Mombasa, 16/- to 16/6; fair, 17/- per cwt.  
COFFEE—Jamaica, ordinary to good ordinary, 40/- to 48/-; fine ordinary to good middling, 48/6 to 65/-; Santos, 26/6; Pea berry; 49/- to 60/6 per cwt.  
COPRA—East Indian, £24 10s. to £25 10s., c.i.f. per ton.  
COTTON—Good medium fine, 7.05d.; West Indian Sea Island, good medium, 19½d.; medium fine, 20½d.; fine, 22d. per lb.  
FRUIT—  
BANANAS—Jamaica, 5/6 to 7/6 per bunch.  
PINE-APPLES—St. Michael's, 1/6 to 4/- each.  
FUSTIC—£4 5s. to £4 15s. per ton.  
GINGER—Jamaica, common to good common, 65/- to 74/-; ordinary to good bright, 75/- to 86/- per cwt.  
HONEY—18/6 to 22/6 per cwt.  
ISINGLASS—West Indian lump, 1/8 to 1/11 per lb.  
LIME JUICE—Raw, 1/6 per gallon; concentrated, £25 per cask of 108 gallons; Distilled Oil, 2/11 per lb.; hand pressed, 3/3 to 3/6 per lb.  
LOGWOOD—£4 5s. to £4 15s.; roots, £3 5s. to £4 5s. per ton.  
MACE—fair to palish, 1/8 to 1/9; good red, 1/7; fair red, 1/5 to 1/6; broken, 1/2 to 1/4 per lb.  
NUTMEGS—65's, 1/4; 73's to 76's, 10d. to 10½d.; 78's to 84's, 9½d. to 10½d.; 88's to 92's 8d. to 9½d.; 94's to 100's, 6½d. to 8d.; 106's to 126's, 5½d. to 6½d.; 130's to 138's, 5¼d. to 5¾d. per lb.  
PIMENTO—Fair, 2½d. per lb.  
RUM—Jamaica, 2/8 to 2/11; Demerara, 1/- to 1/2 per proof gallon.  
SUGAR—Crystals, well made yellows, 16/3 to 18/-; Muscovado, Barbados 89°, 9/5¼ floating landing; Molasses, Trinidad, 12/6 per cwt.

Montreal,—April 23, 1907.—Mr. J. RUSSELL MURRAY.  
(In bond quotations, c. & f.)

COCOA-NUTS—Jamaica, \$29.00; Trinidad, \$27.00 per M.  
COFFEE—Jamaica, medium, 10c. to 12c. per lb.  
GINGER—Jamaica, unbleached, 16c. to 18c. per lb.  
MOLASSES—Barbados, 25½c.; Antigua, 20c. per Imperial gallon.  
NUTMEGS—Grenada, 110's, 17c. per lb.  
PIMENTO—Jamaica, 5¾c. to 6c. per lb.  
SUGAR—Grey crystals, 96°, \$2.50 per 100 lb.  
—Muscovados, 89°, \$2.03 per 100 lb.  
—Barbados 89°, \$2.60 to \$2.70 per 100 lb.

New York,—May 3, 1907.—Messrs. GILLESPIE BROS. & Co.

CACAO—Caracas, 18½c. to 19c.; Grenada, 17c. to 17½c.; Trinidad, 17¾c. to 18½c.; Jamaica, 15½c. to 17c.; Dominica, 16c. to 16½c. per lb.  
COCOA-NUTS—Jamaica, New York selection, \$25.00 to \$26.00; Trinidad, \$23.00 to \$24.00 per M.  
COFFEE—Jamaica ordinary, 7¾c. to 8c.; good ordinary, 8¼c. to 8½c.; Rio No. 7, 6½c. per lb.  
GINGER—Dark scraggy root, 11¾c. to 12½c.; small to bright bold, 12¾c. to 16c. per lb.  
GOAT SKINS—Jamaica, Antigua, and Barbados, 59c.; St. Kitt's, St. Thomas, and St. Croix, 53c. to 55c. per lb.  
GRAPE FRUIT—Florida, \$2.50 to \$3.00 per barrel; Jamaicas, \$1.00 per barrel.  
LIMES—\$7.00 to \$9.00 per barrel; \$1.50 to \$1.75 per box.

MACE—35c. to 37c. per lb.

NUTMEGS—95's to 100's, 17½c.; 100's to 110's, 13c.; 130's to 140's, 12c.; broken and shrivels, 7½c. to 8c. per lb.

ORANGES—\$2.00 to \$2.50 per box; \$4.00 to \$4.50 per barrel.

PIMENTO—5¼c. per lb.

SUGAR—Centrifugals, 96°, 3.765c. to 3.83c.; Muscovados, 89°, 3.265c. to 3.33c.; Molasses, 89°, 3.035c. to 3.10c. per lb., duty paid.

## INTER-COLONIAL MARKETS.

Barbados,—May 6, 1907.—Messrs. T. S. GARRAWAY & Co., and Messrs. JAMES A. LYNCH & Co., May 7.

ARROWROOT—St. Vincent, \$4.00 to \$4.75 per 100 lb.

CACAO—Dominica, \$18.00 per 100 lb.

COCOA-NUTS—\$14.00 per M. for husked nuts.

COFFEE—\$10.00 to \$10.50 per 100 lb.

HAY—\$1.20 to \$1.30 per 100 lb.

MANURES—Nitrate of soda, \$65.00; Ohlendorf's dissolved guano, \$55.00; Cotton manure, \$42.00; Cacao manure, \$42.00 and \$48.00; Sulphate of ammonia, \$75.00; Sulphate of potash, \$67.00 per ton.

MOLASSES—16c. per gallon.

ONIONS—Antigua, strings, \$2.00 to \$2.50, loose, \$2.00; Tenerife, bunched, \$2.50, loose, \$1.30 to \$2.00 per 100 lb.

POTATOS, ENGLISH—\$2.40 to \$2.75; Canadian, \$2.10 to \$2.40 per 160 lb.

PEAS—Split, \$5.80 to \$6.00; Canada, \$3.10 to \$3.25 per bag.

RICE—Demerara, \$5.65; Ballam, \$5.10 per bag (190 lb.); Patna, \$3.75; Rangoon, \$3.00 per 100 lb.

SUGAR—Dark crystals, \$2.20; Muscovado, \$1.75 per 100 lb.

SYRUP—17c. per gallon.

British Guiana,—May 11, 1907.—Messrs. WIETING & RICHTER.

ARROWROOT—St. Vincent, \$11.00 per barrel.

BALATA—Venezuela block, 32c.; Demerara sheet, 48c. per lb.

CACAO—Native, 17c. to 18c. per lb.

CASSAVA—No stock.

CASSAVA STARCH—\$6.00 per barrel.

COCOA-NUTS—\$12.00 to \$16.00 per M.

COFFEE—Creole, 14c. to 15c.; Jamaica, 14c. per lb.

DHAL—\$5.25 to \$5.50 per bag of 168 lb.

EDDOS—60c. to 96c. per barrel.

MOLASSES—16c. per gallon.

ONIONS—Lisbon, 4½c. and 5c. per lb.

PLANTAINS—20c. to 60c. per bunch.

POTATOS, ENGLISH—Nova Scotia, \$2.80 to \$3.00 per barrel.

POTATOS, SWEET—Barbados, \$1.20; Creole, \$1.20 per bag.

RICE—Ballam, \$5.90 per 177 lb.; Creole, \$4.75 to \$4.80 per bag (ex store); Seeta, \$5.50 to \$6.00; Patna, \$5.00

SPLIT PEAS—\$5.80 per bag (210 lb.).

TANNIAS—\$1.92 per bag.

YAMS—White, no quotations; Buck, \$2.76 per bag.

SUGAR—Dark crystals, \$2.40 to \$2.50; Yellow, \$2.75 to \$2.90; White, \$3.60 to \$4.00; Molasses, \$1.75 to \$2.00 per 100 lb. (retail).

TIMBER—Greenheart, 32c. to 55c. per cubic foot.

WALLABA SHINGLES—\$3.00 to \$5.75 per M.

Trinidad,—May 11, 1907.—Messrs. GORDON, GRANT & Co.

CACAO—Ordinary to good red, \$18.75 to \$19.00; estates, \$19.25 per fanega (110 lb.); Venezuelan, \$18.75 to \$19.25.

COCOA-NUTS—\$21.00 per M., f.o.b.

COCOA-NUT OIL—90c. per Imperial gallon (cask included).

COFFEE—Venezuelan, 8c. to 8½c. per lb.

COPRA—\$4.00 to \$4.15 per 100 lb.

DHAL—\$4.40 to \$4.60 per 2-bushel bag.

ONIONS—\$3.00 to \$4.25 per 100 lb. (retail).

POTATOS, ENGLISH—\$1.50 to \$2.50 per 100 lb.

RICE—Yellow, \$5.50 to \$5.65; White, \$5.75 to \$6.00 per bag.

SPLIT PEAS—\$5.40 to \$5.50 per bag.

SUGAR—Crystals, \$2.00 to \$2.50 per 100 lb.





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## Selected Cotton Seed for 1907.

IN continuation of the action that has been taken in previous years, the Imperial Department of Agriculture has made arrangements to supply specially selected Sea Island cotton seed grown in the West Indies for sowing during the coming season. The agricultural officers in

the several colonies will receive orders and will deal with them as promptly as possible.

As it is now impossible to obtain supplies of seed from the Sea Islands, the West Indies have to depend on their own resources. Judging by the results obtained during the current season, there is no doubt that the proper selection of seed for planting purposes has given satisfactory results, and therefore it should be recognized that seed selection is a matter of the utmost importance in order to maintain the high quality of the Sea Island cotton produced in the West Indies.

The chief point to bear in mind is that the seed selected is taken from plants which are known to have been thoroughly healthy, uniformly prolific, and to have produced lint of good quality.

It is already established that unless great care is taken in the selection of seed, a rapid deterioration in the quality of the lint is likely to take place. The experience of every successful cotton grower is that the selection of seed is the one thing that cannot be overlooked—hence the importance attached to the matter by the Imperial Department of Agriculture.

The first sign of deterioration in the quality of the lint is the want of uniformity in the length of the fibres, while the general crop is characterised by a preponderance of shorter and coarser fibres. During the last season, a valuable series of experiments in seed selection has been carried out in the various islands, and it has been abundantly proved that it is impossible to obtain first-class cotton from inferior seed. The British Cotton-growing Association has again urged upon those interested in the industry to be most care-



ful in the selection of seed, as, in the event of Sea Island cotton not being right in all respects, it suffers severely in price—more so than any of the commoner sorts.

The ideal kind of cotton plant to cultivate should be pyramidal in shape, about 4 to 5 feet in height, free from disease, and bearing a large number of bolls which should be evenly distributed over every part of the plant. The lint should be uniform, i.e., of even length and should be strong, with good body and lustre.

It should be remembered that, however good the quality of the lint may be, unless a sufficient quantity of it is produced per acre, it will not pay the planter; therefore it is urged that seed should be selected only from those plants which have produced the largest quantity as well as the best quality of lint.

A detailed account of cotton-seed selection, as recommended to be carried out in the West Indies, is given on pp. 31-7 of the new and enlarged edition of the *A.B.C. of Cotton Planting*.

It should be borne in mind by those who receive cotton seed from the Imperial Department of Agriculture during the coming season that it has *not* been disinfected beforehand. This is desirable to be done by the planter himself a day or two before the seed is to be sown. The disinfecting solution is prepared by dissolving one ounce of corrosive sublimate in seven gallons of water.

In order to prevent disappointment in regard to the germinating quality of the seed, it is recommended that immediately on its arrival it should be turned out of the bales or barrels in which it is packed, and put out on a dry floor, in order that any excess of moisture may be removed. After a lapse of a day or two, the seed may be returned into the bags or barrels and kept until it is planted.

It would be useful, also, for the seed to be tested for its germinating power. This may easily be done by placing a definite number of seeds, say 25, 50, or 100, between the folds of damp cloth as described in the *Agricultural News* (Vol. II., p. 153). In case the germinating power is low, more seeds should be planted in each hole in order to obtain a good 'stand' of plants from the first sowing. It should also be borne in mind that the best results are obtained when the selected cotton seed is sown within about a month after it has been received. In the case of disinfected seed, as already advised, this might be sown, if dry, within a few hours or within a day or two after it is treated.

In selecting the best qualities of cotton seed for planting during the coming season, the Department has taken into careful consideration the recommendations made by Mr. Dixon, Managing Director of the Fine Spinners' and Doublers' Association, published in the *Agricultural News* of April 6 last, and also the valuable advice communicated from time to time by the British Cotton-growing Association.

It would appear that there is no necessity to make an immediate change in the general type of the cotton seed for use in the West Indies. It has been clearly shown that the special variety of Sea Island cotton selected by the Department in 1903 is well suited to the conditions existing in the West Indies, and provided the necessary care and attention are devoted to maintaining its character, there is every reason to hope that the West Indies will continue to produce the best grades suitable for the requirements of the spinners.

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#### CONDITIONS AFFECTING LEGUME INOCULATION.

The use of bacteria for inoculating leguminous crops has been experimented with in many parts of the world during the past few years. The results have been varied, but the bulletin recently issued by the U.S. Department of Agriculture on the conditions affecting inoculation contains information of accurate study of the conditions under which a particular leguminous plant might be successfully inoculated and those under which failure to obtain inoculation might be expected. It also affords additions to the present knowledge as to how far the problems of inoculation of seed or soil may become part of the practical routine of an estate. A summary of the results is briefly as follows:—

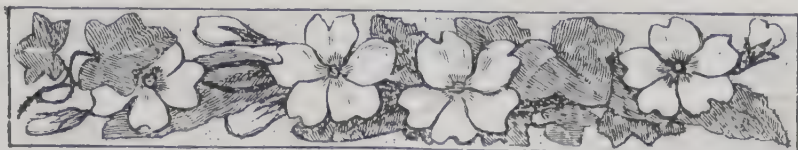
Lime is of decided benefit in obtaining successful inoculations in some soils, more especially in soils showing an acid reaction to litmus. Soil extracts serving as culture media often indicate the probable success of inoculating a leguminous crop. Heavy inoculation by a pure culture increases nodule formation if the soil solution is enriched by the excess of culture medium; however, in a favourable soil a light inoculation well distributed is as effective.

Thorough aeration is favourable to nodule formation, and the functions of a bacterium are influenced by the associative or competitive action of the various groups of organisms with which it comes in contact.

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**Mangrove Bark**, according to the *Bulletin of the Imperial Institute*, is obtained in German East Africa by carefully stripping the trunks and branches of the living trees. It must be rapidly dried, either in the sun or by artificial heat, since its tannin is very soluble, and may easily be washed out by rain or be spoilt by fermentation.





## SUGAR INDUSTRY.

### Sugar in the French West Indies.

Under the general protective policy of the French Government, the islands of Martinique and Guadeloupe disposed of their sugar products almost exclusively in France, but owing to the Brussels Convention, preferential rates on the part of France became impossible and have resulted in some of the sugar of the French West Indies being sent to America.

The *Louisiana Planter* for May 4, commenting upon the difficulties of the sugar planters of Martinique and Guadeloupe, suggests that, as many of the French sugars are of a high grade, they may obtain extra prices on the American market. The following extract gives a brief review of the situation:—

The French West Indies were the scene of the development of the first central factories in sugar-cane countries, the success of the beet-sugar factories in France having doubtless led to the experimentation in Guadeloupe and Martinique.

The successful career of these cane-sugar factories in the French West Indies was insured largely by the fact that such sugars had a preference in the French market, being admitted there at a less duty than other sugars, and as, being cane sugars, they were largely sought by the sugar refiners, this preference actually benefited the producers of sugars in the French West Indies to nearly the full extent of the difference in duties. On this account, for decades scarcely a hogshead of French West Indian sugar ever appeared in the New York market, it all going to France to secure the preferential rates there.

When these factories were first created, they paid for their sugar-cane to the cane growers from 5 to 6 per cent. of the weight of the cane in the value of sugars of their older system of production, then known as good thirds. As we now understand it, there has been a change with the factories in this regard, and they are paying from 5½ to 6 per cent. of the weight of the cane in the value of 96 test sugar in the French import markets.

As in France there is now a heavy import, or excise duty, or as we call it in the United States, an internal revenue tax, on the sugars consumed in the country, the market price of sugars in bond is only about one half of the reported prices of actual sales of sugar in France for consumption. This not being understood in Guadeloupe has led to some newspaper correspondence there, and to the development of considerable ill-feeling.

The value of sugar-cane under their existing 5½ to 6 per cent. contracts has reduced the market value of sugar-cane to \$1.65 per metrical ton. This price being so low as seriously to imperil the cane-growing industry, some of the factories have consented to pay 10 francs, or about \$2.00 per metrical ton, and even under these conditions the trouble has not yet ended.

As many of the French sugars are of the high grade, it is thought that possibly some relief may come to the planters in that way, just as sugar producers in Demerara get an extra price for their handsome crystals, and the planters of Barbados, in many instances, get an extra price for their handsome muscovado sugar, because of its superior flavour.

### Seedling Canes in British Guiana.

The report of the Acting Director of Science and Agriculture, British Guiana, on the areas planted in sugar-cane varieties other than Bourbon, gives returns which show that in the colony 28,801 acres are under cultivation with varieties of sugar-cane other than Bourbon, as compared with 21,481 acres in 1906-7, with 14,743 acres in 1905-6, with 13,860 acres in 1904-5, and with 9,518 acres in 1903-4.

The following table shows the acreage under cultivation in the more important of the varieties:—

Name of Cane.	Number of estates on which cultivated.	Acres under cultivation.	Increase or Decrease. Acres.
D. 109 ... ..	39	11,184	+ 2,798
D. 625 ... ..	34	6,600	+ 3,243
B. 208 ... ..	18	3,189	+ 1,064
D. 145 ... ..	28	2,403	+ 561
B. 147 ... ..	24	1,963	+ 230
White Transparent...	19	1,043	- 404
B. 109 ... ..	7	155	+ 43
D. 95 ... ..	—	153	- 27
D. 74 ... ..	—	98	- 20

The *Demerara Daily Chronicle* for May 10, in reviewing the report, has the following:—

One plantation in Demerara had an area of 5,491 acres planted out in seedling varieties for the season, and another estate in Berbice ranked second on the list with 2,910 acres. Two plantations in Demerara and one in Berbice had between 1,200 and 1,300 acres under experimental tillage, and the same number of estates in each county had between 1,100 and 1,200 acres. There are ten estates in the two counties with between 300 and 400 acres in seedlings, and only one plantation is reported to have an area under 50 acres devoted to these experiments. Clearly, the trials now being carried on are as widely diffused throughout the three counties as the authorities could desire, and all the conditions seem to be present to determine with fairness and accuracy the merits of the varieties now under experiment. The planters appear to have cordially responded to the invitation of the Board of Agriculture to subject the seedlings to the practical tests of ordinary field cultivation, and it is evident that they do not feel disappointed in the results. How far the more popular new canes are maintaining their reputation, or how far they are being superseded by other varieties that have not yet generally secured the public favour are points not touched upon in the report now published. These are matters which will form the subject of another report to be issued at a subsequent date. Whatever may be the lesson that document will contain, it must at least be acknowledged that the planters are keenly alive to the value of these experiments, and are putting themselves to no small inconvenience in order that the tests shall be conducted with full regard for their importance and with a fitting sense of the necessity for absolute accuracy. They have doubtless derived a stimulus in this direction from the threatened failure of the Bourbon cane, as also from the well-attested fact that the seedlings, as a rule, are comparatively immune from disease, and will grow well on land which has been exhausted by the systematic raising of crops of the Bourbon cane for a couple of generations.



## REPORT OF THE CANADIAN TRADE DELEGATION.

The joint report of the delegates from the Boards of Trade of Toronto, St. John, and Halifax who visited the West Indies, was presented at the general meeting of the Board of Trade of Toronto by Mr. James D. Allan on April 9. The following extracts are here reproduced for general information:—

Messrs. Pickford & Black having made the offer to the Boards of Trade of Montreal, Toronto, St. John, and Halifax to take representatives from those bodies to the West India Islands to investigate the possibilities of extending and furthering trade between Canada and those islands, the following delegates were appointed: J. J. McGill, Montreal; James D. Allan, Toronto; H. B. Schofield, St. John; A. E. Jones, Halifax. At the last moment, Mr. McGill, to the regret of the delegation, was unable to go, and it was then too late to appoint a representative in his place. The delegation sailed from Halifax on the Steamship 'Olenda' on February 15, 1907. The first meeting was held at Bermuda, on the way south; thereafter no meeting was held until Demerara was reached. The Demerara meeting was held on March 4, and then meetings were held in the following places in succession: Trinidad, Grenada, Barbados, St. Lucia, Dominica, Montserrat, Antigua, Nevis, and St. Kitt's. At the different points the delegates were met by representative business men and others of the community, who gave them full details of trade, and other valuable information on all points. From the expression of friendship and goodwill given utterance to, we were shown plainly that they are desirous of giving Canada the fullest possible share of their trade. In every place we were extended the most unbounded hospitality, and shown every social and other attention.

### Transportation.

The transportation question has probably more to do with the development of trade relations between Canada and the West Indies than any other of the many problems existing, with the possible single exception of the facilities provided at the sea-board for handling the requirements of traffic by commission houses with promptness and despatch. While this question appears in its most serious form at Trinidad, Barbados, and Demerara, where the volume of trade is greatest, and the steamship connexion with the United States and the United Kingdom is reliable and satisfactory, the Commission has been face to face with it in practically every port of call. The island of Grenada, recently omitted as a port of call for the Canadian boats when the service was changed from fourteen to twelve days, strongly protested against the change. Through the determined efforts of the Governor, assisted by Sir Daniel Morris, our ship made a stop there of six hours, and we were thereby enabled to meet the members of the Agricultural and Commercial Associations. It was pointed out that the importation of Canadian goods, while not large, had shown a steady increase each year until the service was withdrawn. The exports, consisting chiefly of cacao, spices and fruits, are taken in very small volume by Canada. As this island is comparatively one of the wealthiest communities in the West Indies, we feel that every effort should be made to have the steamers call there again regularly, and we further suggest that our various Boards of Trade should recommend this to the Dominion Government.

From St. Kitt's to Demerara the distance between the various ports of call is short, not longer than can easily be accomplished by steamers of moderate speed, during the night runs, which are necessary in order that daylight may be utilized to work cargo; but the increasing demands of the trade would seem to indicate that the company now performing the service should keep in view the necessity of employing steamers of greater speed and of larger size than some of those now on the route. This would shorten the running time between St. Kitt's and Halifax and St. John, and we strongly recommend that *a weekly service be aimed at*, in order that every facility may be provided the Canadian exporter to meet existing competition.

A great deal of complaint was heard regarding the delay of direct shipments in reaching the sea-board from inland points on through bills of lading; and the evidence largely pointed to this as the reason why such a quantity of Canadian products is shipped from New York and entered as American products in the statistical tables kept at ports of entry in the West Indies. The commission houses in New York are very prompt to make shipments, drawing as they do from their large stocks carried at the ports of shipment. This is emphatically the case with flour, oats, and other staple articles, as dealers must receive prompt deliveries in order to take advantage of the markets.

### Exports of the West India Islands.

#### SUGAR.

Owing to the British preference tariff, the exports of sugar from British Guiana and the British West India Islands have increased very materially; so much that they supply almost the whole of the raw material used by refiners situated in Eastern Canada. Statistics show that 165,000 tons were imported into Canada from the British West Indies and British Guiana during the year ended June 30, 1906. In many of the places visited, the idea seemed prevalent that growers of sugar in the West Indies were not securing as much benefit as they were entitled to from the working of the British preference tariff. This question was discussed fully, and it was explained that the principle of this tariff was simply to throw open the Canadian market to British products on more favourable terms than to those of foreign origin, and that it had become a question of supply and demand as to the prices paid by Canadian buyers to West Indian producers. The correctness of this view was generally accepted, it being realized, however, that Canadian buyers must be ready to pay fair prices, as otherwise the West Indies would look to the United Kingdom for their market. In addition to their usual quantity of bright sugar, a number of sales of refining grades have recently been reported from the British market. In Barbados a good deal of muscovado sugar is now being manufactured, sufficiently bright for the grocery trade. A suggestion was made there that the Canadian colour limit should be raised from No. 16 to No. 18, Dutch Standard, so that sugar of the latter colour would not pay any extra duty when entering Canada.

#### MOLASSES.

The trade in this article is on a satisfactory basis, large quantities being exported to various Canadian ports, principally from Barbados, Antigua, and St. Kitt's. In Barbados, 'fancy' molasses is manufactured direct from the cane juice,



## REPORT OF THE CANADIAN TRADE DELEGATION.

and being of superior colour is well liked by Canadian consumers.

### CACAO.

In several of the islands, notably Trinidad, Grenada, and Dominica, this forms a most important article of export. Special attention is being paid to the cultivation of cacao estates. We were impressed with the fact that cacao is a beverage more suitable for general use in Canada than has been appreciated hitherto. Canada seems to draw only a small proportion of her supplies from the British West Indies, and it would seem as if more trade in this staple might be done.

### FRUITS.

The fruit trade of the different places in the West Indies which we visited, does not seem to have been highly developed, with the exception of that in limes. Dominica and Montserrat export limes, lime juice, etc., to the value of £35,600, of which about £100 worth is sent to Canada. It would seem that a larger market should be found in Canada for fresh limes, they being fully equal [if not superior] to lemons, according to the ideas of many.

### COTTON.

The [Sea Island] cotton industry [of the annual value of £200,000] has, we are pleased to note, put new life into many of the planters and Agricultural Societies. The product is commanding a higher price in the British market than that of any other country.

### MISCELLANEOUS.

Venezuelan Block *Balata* can be used for any purpose for which gutta percha is used. It is consumed to a certain extent in Canada. It is now (March, 1907) worth 34c. per lb., f.o.b., Demerara. Demerara Sheet *Balata*, 50c. per lb. *Cassava Starch* considered excellent for laundry purposes, now quoted \$5.50 per barrel of 200 lb., f.o.b. *Cocoa-nut Oil* is used as a food product; price, 85c. per gallon, f.o.b. *Molascuit*: A meal-like mixture of molasses and dried cane-fibre, considered an excellent stock food; put up in 100-lb. bags, quoted in Demerara at \$18 per ton, f.o.b. *Rice*: This product in Demerara is now second in importance only to that of sugar. Two qualities are produced, white and brown. The former appears of good quality, and is now quoted at \$4.80 per 164-lb. bag; the brown is sold largely in the West Indies, taking the place of Calcutta, price, \$4.70 per bag of 176 lb. net. *Kola Nuts*: Used as a basis of various beverages; price, 7c. per lb.; produced also in Grenada. *Broom Corn*: This commodity can be successfully grown in Antigua. It requires only about four months for a crop to reach maturity. Any manufacturer interested in this will probably find a desirable source of supply. The onion trade is a very important one in Bermuda. The onions are exported in April and May, a time when there are not many others to compete with them. The exports in 1905 were: To Canada, 6,000 crates; to the United States, 385,000 crates.

### The Question of Preference.

Whenever the opportunity presented itself, we suggested the adoption by the various colonies of a preferential tariff in favour of British products. The tariffs in the West India Islands are in almost every case for revenue only; and as

these do not always provide sufficient funds to meet expenditures, it was pointed out that they could fix the preferential at the present rate, and raise the general tariff. Mr. Winston Churchill's remarks, in a recent speech in favour of British intercolonial preference, were used to show the probable attitude of the Home Government towards this all-important policy of British commerce. We learned with great satisfaction that the Legislature of the Leeward Islands last year unanimously adopted a resolution in favour of a Canadian preference, and the same has been forwarded to the Home Government. We recommend that these facts should be placed before our Premier, and that he be urged to draw attention to them at the approaching Conference of Colonial Premiers.

### Conclusion.

We cannot close our report without expressing our hearty appreciation of the exceedingly cordial reception extended to the delegation at every point—by the Governors, Administrators, the Agricultural and Commercial Societies, and the people generally. To the splendid organization of Sir Daniel Morris, K.C.M.G., and his lieutenant, Dr. Watts, C.M.G., are particularly due the immense amount of information produced, and the many practical illustrations of existing conditions.

The warm greetings, the facilities provided for our easy and comfortable transportation from place to place, and the social and personal courtesies proffered so generously, have made our mission one of great satisfaction to each member of the delegation, as well as one which we trust will be of value to both countries. The kindness shown by Messrs. Pickford & Black in inviting us to be their guests, as well as the attention and kindness tendered to us by their representative, Mr. Charles S. Pickford, from St. Kitt's to Demerara and return, are also warmly appreciated.

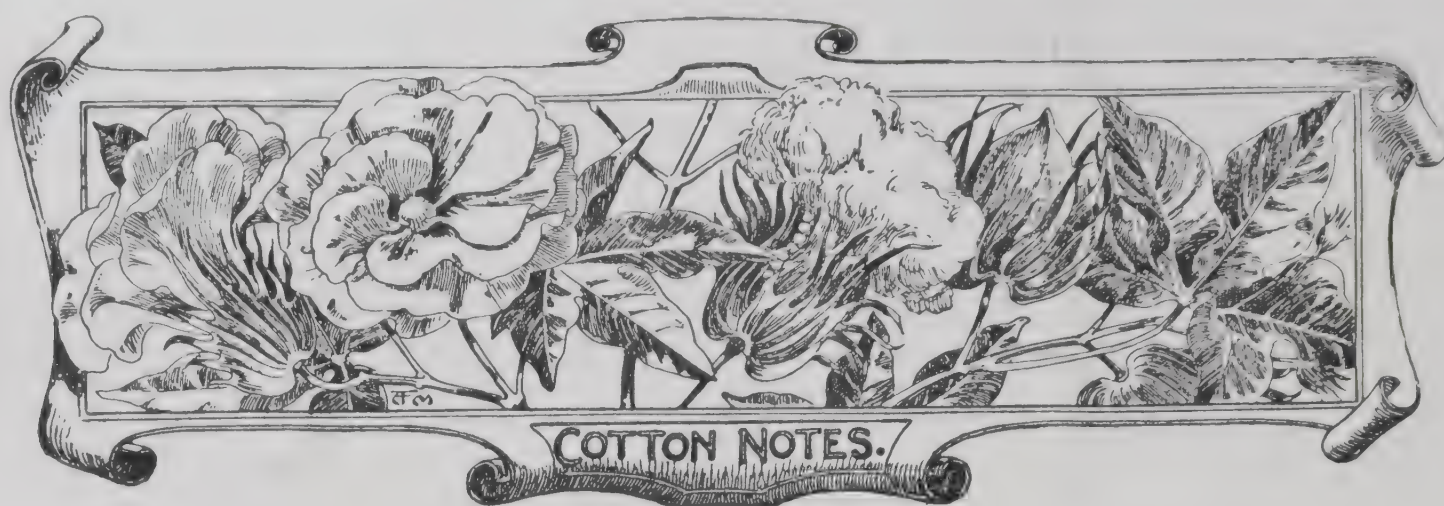
### DATE CULTURE IN CALIFORNIA.

The *American Fruit and Nut Journal* for November 1906, contains an article on the cultivation of date palms in California. The following is a brief abstract:—

The date palms planted in the dry regions of California and Arizona are all from suckers, chiefly imported from Africa. Young plants about three or four years old are brought to the United States from Africa, and meet with a ready sale at \$4.50 to \$5 each. Companies have been formed for the special purpose of importing young African date palms. These young trees may commence to bear in about 1½ years after planting out; but it is several more years before they really produce any considerable quantity of fruit.

From the yield of the palms imported in 1896 by the U.S. Department of Agriculture it is estimated that there should be about 100 lb. of dates a year from one palm. From the excellent quality of the fruit, and the high price it realized, date growing is becoming a recognized industry. Thousands of palms are being planted. In the recently irrigated area of the Colorado desert \$500,000 are being spent in planting imported date palms. There are also private date plantations in South California, and three stations of the U.S. Department of Agriculture in South California and Arizona for the experimental cultivation of the date.





### WEST INDIAN COTTON.

Messrs. Wolstenholme & Holland, of Liverpool, have forwarded the following report, dated May 6, on the West Indian Sea Island cotton market:—

As anticipated in our last report, the demand for West Indian Sea Island cotton has fallen off, and with the exception of about 50 bales Montserrat, which the buyers have been after for some time, the sales are confined to about 10 bales St. Kitt's, 6 bales Barbados, and 10 bales stains, the last at 9*d.* per lb.

Buyers are now disinclined to add to their stocks under existing circumstances, except at a decline of 2*d.* to 3*d.* per lb.; this, however, does not apply to any superfine cotton which may appear.

### COTTON PROSPECTS IN THE SEA ISLANDS.

Messrs. Henry W. Frost & Co's. Sea Island report of April 27, has the following in regard to the next crop:—

The weather has continued unseasonably cool, which has not been beneficial. Besides, replanting has been very general; therefore, the crop will have quite a late and unfavourable start, which is always considered a disadvantage and unpromising for either an early or a large crop.

The report published on May 4, states that:—

The weather has been more seasonable during the week, with general rains, but the seed, which has been only recently replanted has not germinated yet; consequently the crop will have quite a late start.

It is also reported that some of the prospective acreage was not replanted on account of scarcity of desirable seed.

The report of a week later gives the following information:—

For the past week, with frequent rains, the weather has been favourable for germinating the seed. The crop is now all up, and where stands have not yet been obtained they have an early promise of being so. The crop, however is fully three to four weeks late and will require very favourable weather from now on to counteract this late and unfavourable start.

### TYPES OF COTTON SEEDS.

Since the introduction of Sea Island cotton into the West Indies, many variations have taken place in the character of the plants. These variations have been noticeable in the general growth of the plants, in the character of the leaves, in the shape and surface

markings of the bolls, in the length, fineness, and strength of the lint, and in the presence or absence of fuzz on the seeds.

Three distinct types of seeds can be separated:—

- (1) A clean, black type, usually having a short seed stalk, which has the appearance of a sharp spine, attached to the narrow end.
- (2) A type with a small amount of fuzz at both ends.
- (3) A type of seed entirely covered with fuzz.



FIG. 15. { (1) Clean, black seed.  
(2) Seed with a small amount of fuzz at both ends.  
(3) Seed entirely covered with fuzz.

The figures of these types of seeds given above will assist in making clear what is meant by such terms as 'clean black seeds,' 'fuzzy seeds' etc. The drawings of the seeds are twice the actual size.

Each type of seed is produced on a separate plant, but slight modifications may occur on the same plant.

The seeds have a broad and a narrow end, the narrow end being that part which is attached to the special tissue of the boll called the placenta, and the broad end is free in the cavity of the boll. The narrow end of the seed by which it is attached is the *base*, and the broad, free end the *apex*.

The quality of the cotton produced on these types of seeds is not the same, for it has been repeatedly found that the quality of that produced on the seed with a small amount of fuzz at both ends is the best, and, therefore, this seed should always be planted in preference to the other two types.

As a result of discarding for two seasons the clean black type and the type entirely covered with fuzz, it can be already seen that there is a very diminished quantity of both of these types in the crops which have been reaped this season; and as the quality of the cotton produced on these seeds is inferior to that produced on the seeds with a small amount of fuzz at both ends, it can be reasonably assumed that by this simple selection the quality of the cotton, on the whole, has been improved.



## SEASONABLE NOTES.

The season for planting cotton in the West Indies extends from about the beginning of June to the end of September; seed has been planted in almost all the months of the year, but it appears to be generally accepted that June to September give the best satisfactory results.

In order to ensure that the fields are in a proper condition to receive the seed, it is desirable that preparations should be made as early as possible. Most planters now recognize that badly prepared fields can only give inferior results, and that the more labour expended in ploughing and harrowing and in preparing a good seed bed, the greater is the success assured.

Experience also teaches that when the fields have an opportunity of 'cooling out' after the preparations are finished, the young seedlings have a better chance of surviving and becoming vigorous plants.

To secure a large crop is the aim of every planter, and the first step in this direction is in having well-prepared fields for the reception of the seed. The land should be well ploughed or forked, and the surface soil well pulverised.

Good drainage is very important; a sodden soil cannot give good results with cotton. When the soil is heavy, or when there is a tendency for water to stand on the land, the installation of good drains should be especially seen to, and in some instances it might be advisable to make high ridges and plant the seed on or near the top of these. When fields to be planted are situated at the foot of a steep slope, a good drain running along the foot of the slope may prove very useful; where such drains have not been made, deep channels have often been seen cut right across the fields during heavy rains, and much damage has resulted.

Good wind-breaks are necessary in many instances; the West Indian cotton plant is very delicate, and protection should always be made when the land is unusually exposed. Steep, windward land facing windward should be avoided, as it is likely to cost more in wind-breaks than the plants gain from the protection afforded by them.

Wind-breaks may be formed by planting headrows of pigeon peas or guinea corn. Five or six rows of guinea corn planted alternately serve the purpose admirably; but a single row is of very little use. The seed for these windbreaks should be planted as early as possible so as to be ready to alter the cotton soon after it appears above ground.

Where pen manure and sheep manure are to be applied, there should be no delay in getting them into the land; the earlier it can be put in, the greater will be the benefit that the cotton derives from it. As to the quantities to be applied, experience shows that about half the quantity given to the soil gives the best results; an excess usually causes the plants to produce too much wood, and a diminished quantity of cotton.

Samples of seed cotton obtained from plants selected in the field for their good qualities have been received at this department for further examination. These samples have been received from a number of estates in Barbados and St. Vincent, and from the Botanic Stations at Montserrat and Kitt's; plants were also selected in Antigua, and the seed-cotton is being obtained from them. It is of interest to note that the seed grown from a few selected plants, after being sown in a nursery and grown for one season, has supplied sufficient seed to plant on an average about one acre each.

## THE PLANT A LIVING MACHINE.

The study of plant physiology has done much towards unravelling many of the so-called mysteries of plant life, and it is becoming recognized by all up-to-date agriculturists that the living plant is a highly complex machine—a machine that is supplied with energy from without for the proper working of the different parts that go to form its structure.

In 1901, the late Professor Marshall Ward in his book on *Disease in Plants* pointed out that in view of the enormous strides made in the study of the physiology of plants during the last quarter of a century, it was becoming recognized that attention should be 'more concentrated on the living plant itself and on the physiological actions which make up its life.' The living plant must be regarded as a sort of working machine—infinitely more complex than any machine made by man, but a machine nevertheless—the purpose of which is to store up energy from the sun, and so to add to our wealth on this planet, at the expense of the extra-terrestrial universe.

Dr. N. A. Cobb, formerly Director of the Division of Pathology and Physiology, Hawaiian Sugar Planters' Association, in a report on 'Some Elements of Plant Pathology' states that careful study of healthy living plants must constitute no mean part of the work of any institution that attempts to deal rationally with plant diseases, and shows the importance of the subject of plant physiology by referring to what agriculture really is. He states the following:—

In my opinion the term agriculture is not an altogether happy one. I fear the use of that word has done something towards the perpetuation of a serious error. The word points to the soil as if that were the principal element in the growth of crops. It means the cultivation of the field, while the fact is, it is the plants that are cultivated. The word agriculture is one that seems to indicate that the soil is the most important thing in the growth of crops. The plant is the most important thing. The soil is no more the main thing in agriculture than the bed of a river is its principal feature. The moving stream of water is the principal thing. It is the water that can furnish power and float ships; it is the water that can vivify the desert. The field or the soil bears some such relation to the stream of living crops that flows through it year after year, as the bed of a river bears to the water streaming over it.

This is by no means an altogether barren idea. Our progress in agriculture will bear some ratio to the firmness with which we lay hold of the idea that in the growing of crops, the plants are, after all, the main thing. If the plant is the main element in crop production, we must take the greatest pains to understand the plant. We must understand its anatomy, its physiology, and its pathology.

Agriculture is the art of rearing healthy, vigorous plants, and so considered, may even be regarded as an application of the facts of plant physiology and pathology.

It should not be concluded, however, that the plant should receive the whole attention, for it is becoming recognized that the soil is a much more complex body than was suspected until comparatively recently. A scientific agriculturist has to consider the properties of soils in relation to solutions they yield to water in contact, the manner in which they retain some solutions and allow others to pass easily, and he must also acquaint himself with the physical properties of ordinary soils with respect to the phenomena of capillarity, absorption of heat, etc.



## EDITORIAL NOTICES.

Letters and matter for publication, as well as all specimens for naming, should be addressed to the Commissioner, Imperial Department of Agriculture, Barbados.

All applications for copies of the 'Agricultural News' should be addressed to the Agents, and not to the Department.

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# Agricultural News

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## NOTES AND COMMENTS.

### Contents of Present Issue.

The editorial (pp. 161-2) deals with the supply of specially selected cotton seed recommended by this Department for planting during the coming season.

The sugar industry of the French West Indies is briefly reviewed on p. 163, and some data will also be found relating to sugar-cane in British Guiana.

The Report of the Canadian Trade Delegation, portions of which are reprinted on pp. 164-5, affords interesting information.

Amongst the notes for cotton growers given on pp. 166-7 will be found a brief article on the types of cotton seeds. Particular attention is drawn to this, in view of its important bearing upon proper seed selection.

Under insect notes an article on jiggers is to be found (p. 170).

Under science notes on p. 171, two brief articles on dyewoods are given.

An illustrated article on the pine-apple is given on p. 171.

The attention of stock breeders is drawn to the article on the dehorning of cattle (p. 172).

The brief review on some of the fungus diseases of crops in St. Vincent, given on p. 173, is of interest.

### Rubber in Bolivia.

According to the British Consul in Bolivia, 'the rubber industry continues on a satisfactory footing. The amount exported, as also the revenue obtained from the same, exceed very considerably the figures of the previous year. As the Bolivian rubber is either exported by way of Manaos (Brazil) or Mollendo (Peru) many of the European consumers erroneously think that they are using a Brazilian or Peruvian product. This, of course, does not affect the consumer in any way, but it certainly deprives this country of the merit to which she is justly entitled. With regard to cultivated rubber, no serious steps have been taken as yet, though the subject is much talked of.'

### Cotton Industry in Tobago.

With a view to rendering all assistance possible to the cotton planters of Tobago, the Government of Trinidad and Tobago has issued instructions for the erection of suitable machinery, for the ginning of cotton grown in Tobago, on the wharf at Scarborough. Steps will be taken immediately to erect the same for the use of cultivators of cotton.

The Government also notifies that a sufficient quantity of suitable cotton seed will be provided for cotton planters for this next year's crop, and that intending planters should inform the Curator of the Botanic Station at their earliest convenience as to the acreage they intend to plant, so that sufficient seed may be obtained to meet the demand.

### Manuring Sugar-cane in the Leeward Islands.

A summary of the results of the manurial experiments with sugar-cane carried on, under the direction of the Imperial Department of Agriculture, at Antigua and St. Kitt's during the year 1905-6 has just been issued as pamphlet No. 47.

These experiments have now been carried on for six years in the case of plant canes and for five years with ratoons. It is therefore possible to draw conclusions as to the manurial requirements of the sugar-cane in the Leeward Islands with some measure of confidence.

The results again clearly show that no artificial manures are required for plant canes when an application of about 20 tons of good pen manure has been given. The results agree closely with those obtained in former years and are so definite that the experiments with plant canes are now brought to a close. With ratoons, however, artificial manures are necessary for the production of the best crops; but as it has been shown that artificial manures are not required for plant canes in addition to pen manure, it has become necessary to inquire what manures will be required when ratoons follow plant canes which received no artificial manures. A 'new series' of experiments has therefore been started, in which no additional artificial manures are applied to the canes as plants, while those which received artificial manures as plant canes will be known as the 'old series.'



## Botany of Montserrat.

The *Journal of the New York Botanical Garden* for April contains a brief report by Dr. J. A. Shafer on a visit to the island of Montserrat for the purposes of botanical exploration.

Five weeks were spent in the island, and the plants collected were dried in the sun in numerous well-ventilated packages of driers not over 3 inches thick.

Botanically, the island is scarcely known, for the only collections of plants made thereon would appear to have been collected about 1802 by Dr. John Ryan, information concerning whom could not be obtained during the visit of Dr. Shafer.

The report, besides giving a list of some of the plants collected, deals briefly with the economic position of Montserrat. It refers to the decadent condition of the sugar industry, to the promising outlook for cotton, to the lime industry, and to the preparation of arrow-root starch and papain. Cacao is being grown in the central mountains, and experimental plantations of vanilla, pepper, pimento, and nutmegs have been started at several places. Bay oil is also obtained in fairly large quantities.

## Cotton-cake-meal for Feeding Purposes.

Experiments on the value of cotton-cake-meal as food for live stock are being carried on throughout the United States, and, from the results briefly reviewed in the *Southern Planter* for May, it would appear that information of value has been obtained.

It is reported that draft horses do well on a ration containing 2 lb. of cotton-cake-meal, and that large numbers of cattle are fattened every year at the oil mills of the southern United States exclusively on cotton seed hulls and cotton-cake-meal; while feeding cotton-cake-meal to dairy cows has, in general, proved satisfactory when the allowance has not exceeded 5 or 6 lb. daily for short periods, and 3 or 4 lb. for long periods. The results of experiments to ascertain the effects of cotton-cake-meal on the quality of butter appear to be contradictory, as some experimentalists state that satisfactory butter can be made when cotton seed and its by-products are fed in reasonable amounts, while others are of opinion that they give it a tallowy consistency and make it deficient in natural colour.

At the North Carolina Station two calves getting from 1 to 6 oz. of cotton-cake-meal daily, died after one month's feeding. Other instances of the same kind are reported. At the Texas Station investigations were conducted with the use of cotton seed and cotton-cake-meal for pigs, and the results show that the mortality of pigs receiving cotton-cake-meal was 87 per cent.; when washed cotton seed was fed, it was 75 per cent., and for boiled seed, 25 per cent.

The outcome of the experiments would appear to show that when cotton seed or its by-products are fed in reasonable quantities with a proper complement of other feeding stuffs, satisfactory results are obtained with all animals *except calves and swine*.

## Cotton Growing in Africa.

The *India Rubber World* of May 1 states that the total cotton production in Africa this year is estimated at 40,000 bales of a value of about £500,000. Of this, 15,000 bales are expected from the British colonies in West Africa, and is almost entirely due to the work of the British Cotton-growing Association during the last four years.

The German colonial administration and the French Colonial Cotton Association are earnestly stimulating cotton planting in their African colonies.

## British Guiana and its Resources.

The *West India Committee Circular* for May 7 contains a summary of a lecture given by Professor J. B. Harrison, C.M.G., on April 25, at the West India Committee Rooms, on 'British Guiana and its resources.'

The resources of British Guiana fall under four heads—agricultural, forest, mineral, and power resources. Each of these was treated separately and received distinct notice.

Of the agricultural industries, sugar is the most important, and is almost solely in the hands of large capitalists and wealthy companies. The opinion was expressed that under equal conditions of fiscal treatment British Guiana's resources for cane growing were equal to those of any other country. The rice-growing industry was one for small holders and its development was principally due to the East Indian settlers. The area under rice has increased from 6,000 acres in 1900 to about 24,000 acres in 1906. About 2,000 acres were occupied by cacao and the yield was mainly used for the local demands, only about 400 cwt. being exported yearly. Coffee cultivation occupied about 1,400 acres, but practically the whole of the product was consumed locally. Limes grow well on the lighter soils and bear large crops of juicy fruits. It has not proved possible to grow Sea Island or Egyptian cotton on the available soils of British Guiana, but local varieties, the quality of which is about equal to rough Peruvian, flourish in many districts. It was suggested that the cultivation of bananas was probably the most promising undeveloped agricultural resource of the colony and that this industry could be rapidly evolved if transportation facilities could be provided.

Enormous timber resources are awaiting development, for the only timber exported in any quantity is greenheart. During the last two years considerable interest has been taken in the prospects of rubber collection and cultivation in the colony.

Gold and diamonds form the chief of the mineral resources, the exploitation of which must be regarded essentially as belonging to the black section of the population, much as the rice industry is considered the industry of the East Indians.

Cataracts and falls on the rivers have, as yet, received little attention as sources of power for the development of the mining and timber resources of the colony, but, doubtless, in time they will be utilized as sources of electrical energy.





## INSECT NOTES.

### Chigoes or Jiggers.

Among the external parasites of domesticated animals, that group of insects known as fleas occupies a prominent place, on account of the numbers of individuals in any species, on account of the variety of hosts attacked, on account of their inconspicuous life habits in the young stages, and last, but not least, on account of the annoyance and injury caused by the insects to man himself.

The fleas, as a whole, have long been considered a group in the natural order Diptera, the two-winged flies, but recently they have been classified as an order by themselves under the name Siphonaptera by many entomologists. The name refers to the sucking mouth-parts and the wingless condition of the adults.

Professor Herbert Osborn, in a bulletin published by the U. S. Department of Agriculture (1896), gives twelve species of this group of insects as occurring on wild and domestic animals in North America. The species of greatest interest and importance in the West Indies are the cat and dog flea (*Pulex serraticeps*), the house flea (*Pulex irritans*), the hen flea (*Sarcopsylla gallinacea*), and the chigger (*Sarcopsylla penetrans*). 'The eggs of fleas, while sometimes laid upon the hairs of the host animal, are loosely attached, and must ordinarily be scattered in places where the host-forms sleep or nest. The larvae, so far as is known, live in dust or litter in similar locations. They are slender, worm-like, footless objects, with a sparse covering of hairs. The pupae form in similar locations, enclosing themselves in cocoons.'

The chigger (*Sarcopsylla penetrans*) was described by Linnaeus in 1767. It is a native of the Americas. It is distributed throughout tropical and subtropical America, and has been introduced into tropical Africa. It is usually considered of importance on account of its attacks on man, but Osborn states that it attacks lower animals, especially the cat and the dog; while, in addition to these, sheep, goats, cattle, horses, mules, asses, and even birds, serve as hosts for this insect.

The adult chiggers attack man (and other hosts) in the same way that other fleas do; but, in addition, there is the characteristic attack of the female, which penetrates into the flesh, generally of the foot. While in this position, the abdomen swells to the size of a pea, being distended with the developing eggs. At this time the anterior part of the insect is merely a brown spot on the surface of the large, white egg-sac. Examined with a pocket lens, the mouth-parts and legs can be distinguished.

During the development of the egg-sac, a considerable amount of irritation is experienced by the victim of the attack. The insect should be removed from the flesh without breaking the egg-sac, so that none of the eggs or maggots may be left to increase the irritation in the wound. If this be done, no serious results are likely to follow; but if these insects are neglected, serious abscesses are formed.

Peasants who wear no foot covering are, of course, most subject to attack; but visitors to the sea-side, and persons

who walk frequently in infected pastures are also liable to come in contact with this disagreeable insect.

Fleas of all species can best be controlled by the destruction of their breeding places. Pyrethrum powders or benzine on the floors of infested houses, in the sleeping places of cats and dogs, and in the runs of fowls, will generally be effectual in getting rid of these pests. A free use of Pyrethrum in the clothing and beds will afford a certain amount of protection to people living in infested houses. The only satisfactory remedy is the destruction of the young in their breeding places, and absolute cleanliness.

### Insects and Water.

The following account of insects drinking water after several days in a box *en route* from St. Kitt's to Barbados may be of interest to readers of the *Agricultural News*. Insects that feed on the foliage of trees and shrubs are rarely seen to drink water, as the leaves that form their food generally contain moisture sufficient for their needs:—

Some time since, specimens of a snout beetle (*Epicaerus ravidus*) were received from St. Kitt's with the information that they were attacking cotton, feeding upon the leaves. This insect has been reported as feeding on the leaves of citrus trees, but never as a serious pest, nor have any further reports of its occurrence on cotton been sent to this Department.

On the arrival of the specimens mentioned above, many were dead, some barely alive, and a few in normally active condition. As they had been several days in transit, it was thought they might have suffered from want of food, and, therefore, a cotton seedling in a vial of water was placed in a large dish with several of the beetles. In a very short time one of them was seen either drinking from the moisture on the outside of the vial or attempting to get through the glass at the water inside. A small dish of water was provided, and the insects brought to it. The first, placed on the edge of the dish, at once went down to the water, and, inserting the tip of the snout in the water, remained in that position several minutes; then turned about, and walked quickly away.

Two beetles that appeared to be nearly dead were put into the water, and after a short time were taken out and placed a little distance from the dish containing the water. One at once began walking about, and, after a few seconds, the other. They were put on the edge of the dish; both went directly to the water. Taken from the water again, they wandered about actively, but both returned and stood with the tip of the snout immersed.

Seven beetles that had already had water were put in the vicinity of water, and within five minutes, one had found it and was drinking. During this experiment none of the beetles attempted to eat; all seemed intent only on drinking.

In an article entitled 'How Insects are Distributed,' in the *Canadian Entomologist* for March 1907, it is stated that most of the seriously injurious insect pests in Canada have been imported, 75 per cent. at least having come directly or indirectly from Europe. The influence of the wind is also given as a strong factor in insect distribution and it is mentioned that the cotton moth, which does not breed north of the cotton-growing district, has been found in Ontario, having been carried by the wind. It is noted too that scale insects are spread from tree to tree by means of wind, which blows the young active scales about, and infested leaves and twigs from place to place.



## SCIENCE NOTES.

## Logwood.

The leguminous tree *Haematoxylon campechianum*, yielding logwood, is a native of Central America.

It may reach 30 or more feet in height, but has a short irregular trunk 18 inches or more in diameter, with large branches. Its compound leaves have six or eight leaflets. The stipules are usually thorny. The yellow flowers are in axillary erect racemes, and are very attractive to honeybees. There are five, nearly-equal petals, and ten, separate stamens. The pod is flattened and membranous, so as to be blown by the wind. It contains usually two seeds, and readily splits lengthways.

The sapwood is whitish, but the heartwood turns red or purple on exposure to the air. The wood is quite hard, and sinks in water. The pores are visible in concentric zones of softer tissue of paler hue. The rays are very fine.

Fresh logwood contains a colouring matter, haematoxylin, which changes to a red or blue in the presence of alkalis. Logwood is much used for dyeing violet, blue or black, and for making ink. Haematoxylin is an important stain for microscopical objects. This wood, which becomes dark-purple or black on long exposure, is occasionally used for fancy ware. Since there is a certain amount of tannin in logwood, it is sometimes employed as a mild astringent and hence its inclusion in the Pharmacopoeia. Logwood extract is a solution of about 80 per cent. of the dye in water.

During the past few years growers of logwood in Jamaica have been somewhat alarmed by an apparent increase on their properties of an unmerchanted variety, known as 'bastard' logwood.

The following abstract on 'bastard' logwood has been taken from a paper that was reprinted in the *Jamaica Bulletin*, 1904, p. 241-50:—

'Bastard' logwood yields little or no haematoxylin, but, instead, a yellowish-green pigment that is of no value. Chips of 'bastard' logwood present a yellowish appearance instead of the dark-red or deep-purple of the best Jamaican or Mexican logwoods of commerce. It would appear that 'bastard' logwood is not the results of injury or disease, but that it represents a variety of *Haematoxylon campechianum* that normally produces little or no haematoxylin.

## Fustic.

The yellow dyewood fustic is obtained from a slow-growing tree *Chlorophora tinctoria*, which is indigenous to tropical America, including the West Indies.

It may reach 50 feet in height, and up to 2 feet in thickness. Its alternate, ovate, entire or serrate leaves are 2 to 6 inches long. There are two kinds of flowers, on separate trees. The staminate flowers are in axillary catkins, with four calyx segments and four anthers. The pistillate flowers, with their four calyx segments and long feathered stigmas, are in stalked axillary clusters and form a mulberry-like, edible, compound fruit of a yellowish-green colour, about  $\frac{1}{2}$  inch across. The trees flower after midsummer.

The wood is sulphur-yellow or orange, and about seven-tenths of the weight of water. It is used in mosaic and cabinet work and is often made into furniture. The pores are in wavy groups and the rays are small and uniform. A yellow dye is extracted, but it would appear that other woods which yield a yellow dye are often called by the name of 'fustic.'

## THE PINE-APPLE.

The pine-apple, *Ananas sativus*, belongs to the American order *Bromeliaceae*. Its name is doubtless derived from the Spanish piña, which means the cone of a fir-tree. It is a native of tropical America. It seems more or less a desert plant, and resists drought well.

The fruiting stem grows from the centre of a circle of long, fibrous, rather narrow, pointed leaves, often with toothed edges. The blue flowers are in the axils of toothed bracts in a flower-head at the end of the stem. The three-celled ovary is below the flower. There are three small sepals, three blue petals, and six stamens. When the flowers have fallen off, the ovaries fuse together, and with the main stem and the bases of the bracts form a compound fruit. The terminal leaves have no flowers in their axils and compose the crown. The flowers do not seem to be self-fertile and there are usually no seeds.

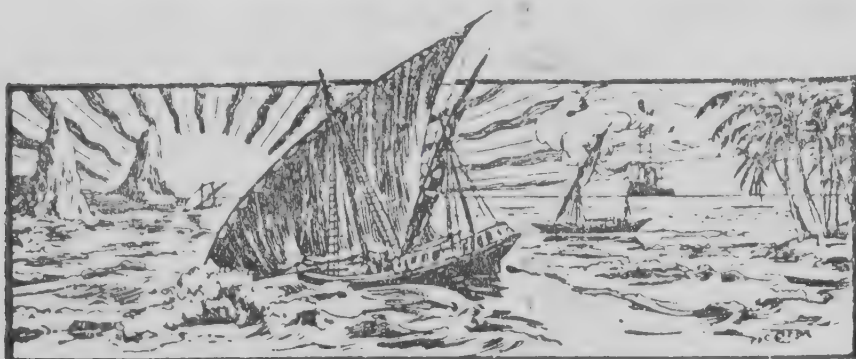


FIG. 16. PINE-APPLE IN FRUIT.

(From *The Book of Trinidad*.)

The pine-apple fruit contains sugar, acids, and a digestive ferment. This ferment is, no doubt, destroyed when the fruit is heated in the process of canning. The pine-apple may be propagated by suckers from the lower leaf axils; slips from below the fruit, or below the crown; or by the crowns. When planting all these, especially the last, a number of the leaves should be stripped off to allow free room for the roots, which grow out from the stem between the leaves. Pine-apples can be easily cross-fertilized and new varieties grown from the seeds (*Agricultural News*, Vol. VI, p. 4). The two most important commercial varieties seem to be 'Red Spanish' and 'Smooth Cayenne.'





## GLEANINGS.

Correspondence in regard to supplying donkey stallions of Spanish breed is invited by Mr. Harold Sessions, Wootton Manor, Henley-on-Thames, England. Mr. Sessions has already shipped successfully some animals to the West Indies.

The United States Consul at Darango reports that the cotton crop of Mexico, or at least of the principal cotton belt of Mexico, has been an unusually large one, but that great difficulty has been experienced in getting and keeping the required number of labourers to gather the crop.

The production of sugar in Haiti is gradually increasing, and for the last few years considerable attention has been paid to cotton planting. It is hoped that cotton in the near future will make up the deficiency in the coffee crop. (*U. S. Monthly Consular Reports*, April.)

The report of Messrs. Lewis & Peat on the shipment of six cases of Castilloa rubber by the Poole Syndicate, Trinidad, is, on the whole, very satisfactory. The rubber was valued at 4s. 4d. per lb., and the brokers stated it was quite likely that, with a little better demand, it might fetch 4s. 6d. per lb. (*Port-of-Spain Gazette*, May 10.)

During the year ended June 30, 1906, Canada imported \$113,983 worth of West Indian fruits as against \$78,301 worth during the corresponding period ended June 30, 1905—an increase of \$38,682 in the value of fruit imports to Canada from the British West Indies. (*The Maritime Merchant*, May 2.)

Over 700 bales of Sea Island cotton, of an estimated value of £28,000, have been ginned at the Central Cotton Factory, St. Vincent. It is expected that seed-cotton to give over 50 bales of lint will reach the factory during the present month; the total crop may therefore be taken as 750 bales, or, on the average, half a bale to the acre. A St. Vincent bale is about 360 lb.

The *Port-of-Spain Gazette* for May 9, contains a communication drawing attention to the increasing demand for oil seeds, with a view to bringing forward the desirability of giving more attention to products of this nature. Castor oil beans from the West Indies have recently been sent to England and reported upon as being of exceptionally good quality, of the value of 13s. per cwt.

Negotiations are in progress with a view to establishing an electric plant in Trinidad for husking and cleaning coffee, indian corn and similar grain, and for ginning cotton. This will be a great boon, especially to peasant proprietors, who will be able to sell their coffee in husk, corn on cob, and cotton with seed as readily as any other product. (*The Mirror*, May 11.)

Lord Strathcona, High Commissioner for Canada, is informed by telegram from the Minister of the Interior at Ottawa, that capital to the extent of \$2,000,000,000 (£400,000,000) is invested in agriculture in Canada. The annual value of farm produce and crops is \$363,000,000 (£72,600,000), and the annual return is 18·15 per cent. on the capital invested. (*London Times*.)

A paper by Mr. R. L. Holmes, on the 'Phenomenal Rainfall in Suva, Fiji, August 8, 1906,' was read before the Royal Meteorological Society at the monthly meeting held on April 17 by the Secretary, in the absence of the author. The total fall is stated to have been fully 41 inches in about thirteen hours, which probably surpasses anything that has been recorded in any other part of the world in so short a space of time.

Mr. W. N. Sands, Agricultural Superintendent, St. Vincent, is anxious to obtain two or three hens of the Minorca breed for the Agricultural School in that island, in order that young cocks may be raised for distribution. Those in a position to offer hens of the Minorca breed are desired to communicate directly with Mr. Sands, and state age of birds and cost, delivered in crates on board a Canadian or other steamer.

From figures given in the *Barbados Advocate* for May 15, with reference to the yields of cotton this year, it would appear that some estates have, so far, averaged about 700 lb. of seed-cotton per acre, while many others do not appear to have obtained more than 300 lb. 'Pickings continue, and with a little rain the development of the bolls should be greatly assisted, and would perhaps raise the average to nearly 600 lb. all round.'

The old Mico buildings, Hanover Street, Kingston, Jamaica, in which the West Indian Agricultural Conference was sitting at the time of the disastrous earthquake of Jan. 14, are now occupied by several offices and institutions, viz., The Treasury, Government Savings Bank, Stamp Office, Bank of Nova Scotia, Jamaica Agricultural Society, Board of Agriculture, Auditor General's Office, and the Office of the Registrar of Births and Deaths.

Nearly 600,000 bales of henequen fibre, or sisal, are exported from Yucatan every year. The German Consul at Merida writes that prices lately have ruled high, and the trade has developed very considerably in consequence. The Government recently has taken steps to encourage the more extended cultivation of maize, sugar-cane, tobacco, and cotton, but with all that, agriculturists find it more profitable to devote their attention to henequen. (*The Textile Mercury*, April 20.)

The Permanent Exhibition Committee of Dominica has decided to forward exhibits of green limes, mangos, and other fruits in season, to the Colonial Fruit Show to be held in London on June 13 and 14 next. As the development of the green lime trade with England is of the utmost importance to this branch of the lime industry, the Committee hope that planters will forward to the Botanic Station on May 23 and 24, for shipment by the mail, good exhibits of green limes and other fruits in season. This offers an excellent opportunity for Dominica planters to advertise lime fruits in London during the hot months. (*Dominica Official Gazette*, May 11.)



## EDUCATIONAL.

### Teaching of Agricultural Science at Barbados.

The following report by Mr. H. H. Cousins, M.A., Government Analytical and Agricultural Chemist, Jamaica, on the examination in Agricultural Science at Harrison College, Barbados, appeared in the *Barbados Official Gazette* of May 16:—

*To the Secretary of the Board of Education, Barbados.*

Sir,—I have the honour to send a report with the marks obtained by the six candidates from Harrison College in the examination in Agricultural Science based upon the papers you sent for me to mark.

The work sent in on three papers 'cane planting,' 'sugar manufacture,' and 'practical sugar chemistry' must be regarded as very satisfactory. The six candidates have obtained an average of 74 per cent. of the maximum on the three papers. The accounts given of the pests of the sugar-cane were particularly good, and local matters of cultivation and manufacture were treated in a practical and intelligent manner. Some of the figures given for the chemical composition of the sugar-cane and of molasses were considerably in error, and one or two candidates, in an apparent desire to answer the questions fully, put forward statements that indicated some confusion of ideas.

On the whole, however, the results must be considered eminently satisfactory, and afford proof that a sound course of study has been provided. The results of the practical work were better than usual and a good standard of accuracy was maintained in the determinations.

### Nature Study in Schools.

Nature Study has been introduced into many English and American public schools; in some of the schools of the United States the courses include the following:—

Observations on bats, birds, lizards, frogs, toads, and other insect eaters, with regard to what insects they eat, and how they are in this way the friends of man.

Making a census of birds' nests in the vicinity, and encouraging insect-eating birds by building 'bird homes,' supplying nest materials, giving dishes of water or food, rearing deserted nestlings, etc.

Aiding in the warfare against insects. It is estimated that insects cost the United States from three to four hundred million dollars a year, and of this sum it has been reckoned the children of all the schools in the United States in the course of their nature study might save at least one third. Thus their out door nature study becomes work for the good of the community and gains in interest.

Keeping freshwater aquaria and vivaria to observe the development of toads, mosquitos, caterpillars, lizards, etc.

Aiding in the warfare against malaria by destroying mosquitos by drainage, kerosene, or the introduction of small fish or tadpoles into ponds.

Learning to care for plants; there being an annual school competition, each scholar growing one specimen of a flowering plant from seed supplied. Planting fruit trees of their own raising round the school or at their homes. Caring for their home gardens.

Keeping naturalists' calendars in the school by noting the times of blossoming of common flowers; the appearance, nesting, etc., of the different birds; the broods of injurious insects, etc.

## EFFECTS OF SHADING ON SOIL CONDITIONS.

As *Bulletin 39* of the Bureau of soils, the United States Department of Agriculture has published the results of observations, made in the course of tobacco experiments in the Connecticut valley, on climate, and soil conditions, as affected by the tents used in producing the Sumatra wrapper type of leaf:—

The soil retains more moisture under the tent. This is of special importance during the dry periods, for the soil is in better physical condition because it has not been subjected to packing due to alternate wetting and drying. The temperature is made slightly warmer and the relative humidity of the atmosphere is greatly increased, while the velocity of the wind is much reduced. The plants make a longer, more rapid and earlier growth, thus making it profitable for the cultivator to incur the expense of erecting tents.

## DEHORNING OF CATTLE.

The practice of dehorning cattle, more especially milking cows, would appear to possess several commendable advantages. The following extract from the *Annual Report* of the New Zealand Department of Agriculture for 1906 may be of general interest to stock breeders in the West Indies:—

There are several modes of removing the horns. The simplest and best way is to use one of the dehorning instruments. This removes the horn in a few seconds. The best age for dehorning is from eighteen months to two years. It is always advisable to cut the horn as close to the head as possible, dressing the wound then with Stockholm tar. Calves can also be dehorned with caustic potash; care should be exercised not to allow the potash near the eyes of the calf. A stick of caustic potash can be procured from the chemist. When the calf is dropped, or within the first fortnight, the hair should be clipped round the button or root of the horn. The part should then be rubbed with a stick of caustic potash. A good way is to half fill a small bottle with black oxide of manganese, then fill up the bottle with a saturated solution of caustic potash. When the calf is anywhere from a day to a fortnight old—the sooner the better—take shears and cut the hair from the embryo horn, making a space of about the size of a sixpence; then with the end of an india-rubber bottle-stopper rub the solution in until an appearance of redness is produced. This is certainly the best mode of dehorning, but it must be done when the calf is very young.

## DEPARTMENT NEWS.

Mr. R. D. Anstead, B.A., Agricultural Superintendent, Grenada, left on May 14 per R.M.S. 'Trent' for three months' vacation leave of absence.

Mr. Walter Biffen, B.Sc., of the University College of North Wales, has been approved by the Secretary of State for the Colonies for the appointment of Scientific Assistant on the staff of the Imperial Department of Agriculture in the West Indies in succession to Mr. W. R. Buttenshaw, M.A., B.Sc. Mr. Biffen is expected to arrive at Barbados in the R.M.S. 'Magdalena' on June 4 next.



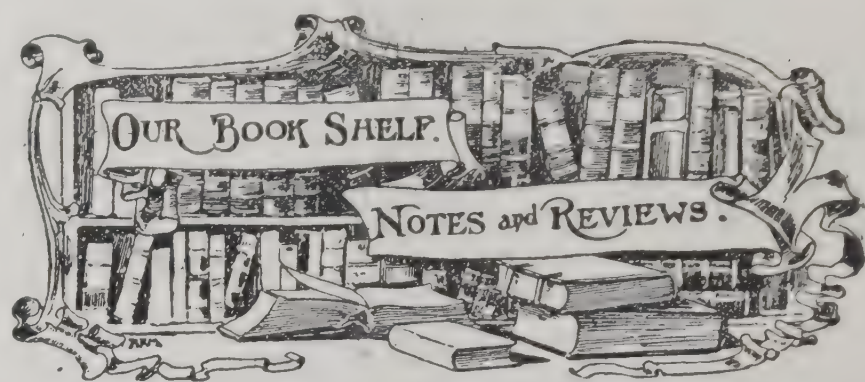
## FUNGUS DISEASES IN ST. VINCENT.

The following brief notes, taken from a report by Mr. F. A. Stockdale, B.A., Mycologist on the staff of this Department, deal with some of the fungus diseases of cotton and cacao in St. Vincent that came under his notice during a recent visit to that island.

**Cotton.**—A large number of small dried-up bolls showed that anthracnose (*Colletotrichum gossypii*) had been prevalent and accounted, to some extent, for the stained cotton that was noticeable in the pickings. Samples of this stained cotton were taken and have been examined most carefully, and have, in almost every case, revealed the presence of mycelium and spores of *Colletotrichum*; while in some badly attacked specimens it has been found, on microscopic examination, that the mycelium penetrates into the seed itself, often rendering it worthless. It should therefore be advised that planters of cotton in St. Vincent be strongly recommended to see that no seed from stained cotton is used for planting purposes; that stained cotton is kept separate from good cotton, i.e., they should not be picked into the same bag; and that disinfection of all seed with corrosive sublimate is carefully carried out in order to destroy all adhering spores of *Colletotrichum*, which may be a source of danger to the young seedlings.

The plants in the field were, in some instances, badly affected with mildew, which, however, does not appear to be a disease of a serious nature. It is generally limited to the older leaves, and probably causes a certain amount of damage in preventing the plants from accomplishing their maximum amount of work in carbon assimilation. The fungus that causes mildew in St. Vincent is the same as that which is present in Barbados but is not yet identified; specimens will be sent away for identification when the investigations into the life-history of the fungus have been completed. Rust (*Uredo gossypii*) was also noticed and specimens were taken.

**Cacao.**—Examples of 'die-back,' 'canker' and 'black-pod' disease were frequently met with and discussed with the Agricultural Superintendent; while the presence of a large number of fruits that never reached maturity brought forth questions as to the condition of health of the trees. This non-maturing of cacao fruits is a source of great reduction to the total crop, and would appear to be mainly a physiological trouble, for continued microscopic examination of early stages revealed no fungal mycelium. In some instances, fertilization had been imperfectly accomplished, and it is more than likely that investigations into the cytological processes involved in the formation of the sex-cells, the union of the latter in fertilization, and the subsequent development of the fruit might be productive of instructive results. (*Agricultural News*, Vol. VI, p. 71.) The presence of a *Phoma*-like fungus on some of the specimens taken might account for the death of a few fruits—a death which may probably have been commenced by irregular nutrition during the early stages of their growth. Some of these undeveloped fruits may sometimes be mistaken for pods attacked by *Phytophthora* and *vice versa*. It would, therefore, be advisable to collect and destroy all dead fruits from the cacao tree systematically, whether they show evident signs of *Phytophthora* or not, in order that it may be made certain that all diseased fruits have been included in this destruction. Attention should be given to cultivation, in order to keep the trees in a vigorous state of health, and manuring should not be neglected. In the light soils of St. Vincent mulching or application of natural manures (such as pen manure, sheep manure, etc.) should prove beneficial in maintaining the health of the trees.



### THE POCKET GUIDE TO THE WEST INDIES:

By Algernon E. Aspinall. London: Edward Stanford, Long Acre, 1907. Price 6s

This neatly bound and handy volume of over 300 pages contains just the information that the pleasure-seeking tourist needs when travelling through the different West India Islands, including as it does an excellent description of each island and the most interesting events in their local histories. It also contains eight clear and handy maps and three folding tables of useful information, and is illustrated with a frontispiece and twenty-eight excellent half-tone reproductions of places of interest. The index of twelve pages is full and complete, and forms a valuable addition to the Guide.

All the British islands as well as British Guiana are described in detail, information being given of how they were acquired, their financial positions, climate, constitutions, industries, etc., in as complete a form as is possible in a pocket guide. Two chapters are devoted to the foreign islands. It was difficult to deal with them more fully in so small a compass. British Honduras has not been included, and no description has been given of the Bahamas, as they are off the 'beaten track.'

The chapter on the West Indian industries is of particular interest in that it affords a concise and readable account of the methods of cultivation and manufacture, preparation for export, etc., of some of the staple products of these islands.

Very few errors are noticeable, but it might be worthy of note in view of further editions, that the Government Geologist of Trinidad and Tobago in a preliminary report on the geology of Tobago states that there would appear to be no evidence (such as lavas or tuffs) of any volcanic action on the island, the rocks of the northern mountainous part of Tobago being originally grits, sandstones, and sandy clays; the middle and southern part is formed of basic igneous metamorphosed rock, while the south-western part is formed of nearly level Tertiary clays, sands, and shell-beds, often covered by terraces of recent coral limestone.

The 'travellers' palm (*Ravenala*), is really of the banana tribe, and should not be included amongst the list of true palms at the British Guiana Botanic Gardens. The Dominica 'crapaud' is not identical with the edible frog of Europe; while the reproduction of the branched cocoa-nut palm from Mayaro, Trinidad, is likely to produce the impression, unless explanation be given, that cocoa-nut palms are usually branched.

On the whole, in spite of a few errors and misprints, inseparable from a first edition, the volume forms a valuable addition to West Indian literature, and is to be specially recommended for the Tourists' outfit, as also for the library of every West Indian home.

**Tourist Trips** have been arranged by Messrs. Elder, Dempster & Co. to and from Jamaica, during the summer months, at £25 return. Bookings will start with the sailing of May 4 from Avonmouth, and May 9, from Kingston, and will cease with the sailings of August 14 and August 29, respectively.



## WEST INDIAN PRODUCTS.

### Drugs and Spices in the London Market.

The following report on the London drug and spice market for the month of April has been received from Mr. J. R. Jackson, A.L.S.:—

The month's review of the drug and spice market during April has not been marked by any special feature, except perhaps by a drop in the price of sarsaparilla, owing to the arrival of larger supplies. The occurrence of the Easter holidays in the first week of the month, was followed in the second week by a somewhat disorganized condition, which usually succeeds a public holiday, so that the month had got half way through before the market assumed its normal condition. The chief items of interest have been as follows:—

#### GINGER.

At the spice auction on the 17th., Jamaica was in good demand at an advance over previous rates of about 2s. per cwt., 82s. to 86s. being obtained for middling to fair bright, 75s. to 80s. for smallish washed, 72s. to 74s. for good common, and 67s. 6d. to 70s. for common dark mixed ratoon; medium and small cut Cochin realized 49s. to 49s. 6d., while washed rough Cochin and brown tips and cuttings were bought in at 37s. and 37s. 6d., respectively. On the 24th., no Jamaica was offered, but it was stated that a large business had been done privately at an advance of from 2s. to 3s. per cwt.; out of 360 packages of Cochin and Calicut, 50 only were sold at steady prices for inferior qualities.

#### NUTMEGS, MACE, AND PIMENTO.

Throughout the month, the sales in all three of these spices were unimportant both as regards qualities and prices.

#### ARROWROOT.

At the beginning of the month, good manufacturing St. Vincent was quoted at 23d. per lb.; a week later a few barrels of fair manufacturing were disposed of at 24d. out of 400 barrels offered; at these prices the article remained steady for the rest of the month.

#### SARSAPARILLA.

At the sale of the 11th., as before stated, much lower prices were obtained for the offerings of sarsaparilla; grey Jamaica sold at 2s. 2d. to 2s. 6d. for part rough to good fibrous; at this rate, 39 bales were disposed of, as were also 11 bales, part coarse, Lima-Jamaica at 1s. 9d.; 16 other bales fetched 1s. 9d. to 1s. 10d., and 9 others 2s. to 2s. 1d. per lb. Fair pale-red native Jamaica sold at 1s. 8d.; common yellow, 1s. 7d.; and dull mixed, 1s. 6d. A week later, the price for grey Jamaica had again advanced, 2s. 6d. per lb. being the price asked. At the close of the month no grey Jamaica was offered, but it was stated that a consignment was near at hand. Ten bales of Lima-Jamaica, part rough, sold at 1s. 9d. to 1s. 10d. per lb., and 3 bales pale-yellow and red mixed native Jamaica, were bought in at 2s. per lb.

#### KOLA, CASSIA FISTULA, TAMARINDS, ETC.

On the 10th. of the month, some 16 barrels of kola from St. Lucia were offered and only 1 was sold at 2½d. per lb., for mouldy. On the 24th., bold bright West Indian kolas sold at 3½d., and dull at 2½d. On the 25th., 3 parcels of fair Dominican Cassia Fistula pods realized 18s. per cwt.

On the 10th., 27 barrels of Barbados tamarinds were sold at 16s. per cwt. in bond. At the same sale, 35 cases of black Calcutta were bought in at 12s. 6d. per cwt. At the final sale of the month, 20 barrels of dry Antigua tamarinds were disposed of at 15s. per cwt. in bond.

Good West Indian distilled oil of lime sold on the 11th., at 3s. 1d. per lb. At the same sale, 5 packages of genuine West Indian oil of pimento were bought in at 6s. 3d. per lb., and 16 puncheons of good pale unworked West Indian lime juice were also bought in at 1s. 6d. per gallon. Of other West Indian oils it may be stated that on the 24th., 2 cases of genuine Dominican distilled oil of bay were offered and sold at 7s. 3d. per lb., and 2 cases of West Indian distilled oil of orange fetched 4s. 9d. per lb.

For 4 tons of fair pale Quassia chips, offered on the 25th., £12 10s. per ton was offered and refused. For chillies there has been a slight increase in prices, good red Nyasaland selling at 58s., and Mombasa being bought in at 23s. For Quillaja bark, £20 to £21 per ton are the prices quoted for sales at Liverpool.

### EXPORTS OF CACAO FROM JAMAICA.

The following is a statement (furnished by the Collector General) showing the amount and value of cacao exported from Jamaica during the last five official years, and also during nine months ended December 31, 1906:—

Period.	Quantity.		Value.		
	Cwt.	lb.	£	s.	d.
1901-2 ... ..	39,953	0	83,923	17	2
1902-3 ... ..	31,462	63	65,284	16	3
1903-4 ... ..	22,008	58	41,540	4	1
1904-5 ... ..	23,458	71	40,757	8	5
1905-6 ... ..	31,066	82	52,813	8	11
9 months to December 31, 1906 ...	38,556	3	74,628	2	2

It would appear that the export of cacao from Jamaica for the complete year 1906-7 is likely to exceed considerably the export of 1901-2, the largest before the hurricane of 1903.

### RAINFALL IN ST. VINCENT.

The following brief note by the Agricultural Superintendent, St. Vincent, appeared in the *Sentry* for May 3, and draws attention to the decrease in the extent of the rainfall for the first three months of the year from 1904:—

It may be of interest to learn how this year's rainfall to April 30 compares with the rainfall recorded for the same period in other years at the Botanic Station:—

January 1 to April 30, 1903.	20.98	inches.
" " " 1904.	22.46	"
" " " 1905.	22.17	"
" " " 1906.	13.85	"
" " " 1907.	13.57	"

It will be observed that the rainfall for 1907 is lowest, and from 1904 shows a decrease.

Whether this is owing to a larger amount of land being put in cultivation, the clearing of high lands, and the disastrous practice of firing lands in the neighbourhood of Kingstown, or whether it is due to the swing of the rainfall pendulum, I cannot say; nevertheless, it appears highly desirable, in order to conserve the water supply of the district, that steps should be taken to prevent the bush-fires so commonly seen recently on the neighbouring hills.



## MARKET REPORTS.

**London**,—May 7, 1907. 'THE WEST INDIA COMMITTEE CIRCULAR,' Messrs. KEARTON, PIPER & Co.; Messrs. E. A. DE PASS & Co., May 3, 1907; 'THE LIVERPOOL COTTON ASSOCIATION WEEKLY CIRCULAR,' May 3, 1907.

ARROWROOT—St. Vincent,  $2\frac{1}{4}d.$  to  $2\frac{3}{4}d.$  per lb.  
BALATA—Sheet, 2/6 to 2/7; block, 1/10 to  $1/10\frac{1}{2}$  per lb.  
BEES'-WAX—£8 per cwt.  
CACAO—Trinidad, 90/- to 96/6 per cwt.; Grenada, 80/- to 84/- per cwt.  
CHILLIES—Dark Mombasa, 16/- to 16/6; fair, 17/- per cwt.  
COFFEE—Jamaica, ordinary to fine ordinary, 37/- to 46/-; low middling, 48/6 to 52/-; Santos, 26/10 $\frac{1}{2}$  per cwt.  
COPRA—£24 to £24 10s., c.i.f. per ton.  
COTTON—Good medium fine, 7'35d.; West Indian Sea Island, good medium, 19 $\frac{1}{2}d.$ ; medium fine, 20 $\frac{1}{2}d.$ ; fine, 22d. per lb.  
FRUIT—  
BANANAS—Jamaica, 5/6 to 7/6 per bunch.  
PINE-APPLES—St. Michael's, 1/6 to 4/- each.  
GRAPE FRUIT, 12/- to 14/- per box.  
ORANGES—8/6 to 11/6 per box.  
FUSTIC—£4 5s. to £4 15s. per ton.  
GINGER—Jamaica, fair to good bright, 87/6 to 93/6; low middling, 80/- to 85/-; ordinary to good ordinary, 73/6 to 79/6; common dark and ratoon, 62/6 to 71/6 per cwt.  
HONEY—good white to pale-amber, 29/- to 30/-; dark to reddish, 19/- to 25/- per cwt.  
ISINGLASS—West Indian lump, 1/10 to 1/11 per lb.  
LIME JUICE—Raw, 1/4 to 1/7 per gallon; concentrated, £24 to £24 10s. per cask of 108 gallons; Distilled Oil, 3/2 per lb.; hand pressed, 3/9 per lb.  
LOGWOOD—£4 5s. to £4 15s.; roots, £3 5s. to £4 5s. per ton.  
MACE—West Indian red, 1/5 per lb.  
NUTMEGS—78's, 9 $\frac{1}{2}d.$ ; 95's to 99's, 6 $\frac{1}{2}d.$ ; 132's, 5 $\frac{1}{2}d.$  per lb.  
PIMENTO—Fair, 2 $\frac{3}{4}d.$  per lb.  
RUM—Jamaica, 2/7 to 2/11; Demerara, 1/- to  $1/1\frac{1}{2}$  per proof gallon.  
SUGAR—Crystals, grey, 14/9 to 15/-; low-yellow to middling yellow, 16/- to 16/6; good, 16/9 to 17/-; fine, 17/3 to 18/3 per cwt. Muscovado, middling grey, 13/-; Barbados, 16/6 (in barrels); Molasses, St. Kitt's, greyish-yellow, 12/9; good pale, 13/6; Trinidad, fine colour syrups, 15/9 per cwt.

**Montreal**,—April 23, 1907.—Mr. J. RUSSELL MURRAY.  
(In bond quotations, c. & f.)

COCOA-NUTS—Jamaica, \$29.00; Trinidad, \$27.00 per M.  
COFFEE—Jamaica, medium, 10c. to 12c. per lb.  
GINGER—Jamaica, unbleached, 16c. to 18c. per lb.  
MOLASSES—Barbados, 25 $\frac{1}{2}c.$ ; Antigua, 20c. per Imperial gallon.  
NUTMEGS—Grenada, 110's, 17c. per lb.  
PIMENTO—Jamaica, 5 $\frac{3}{4}c.$  to 6c. per lb.  
SUGAR—Grey crystals, 96°, \$2.50 per 100 lb.  
—Muscovados, 89°, \$2.03 per 100 lb.  
—Barbados 89°, \$2.60 to \$2.70 per 100 lb.

**New York**,—May 17, 1907.—Messrs. GILLESPIE BROS. & Co.

CACAO—Caracas, 18 $\frac{1}{2}c.$  to 19 $\frac{1}{2}c.$ ; Grenada, 17 $\frac{1}{2}c.$  to 18c.; Trinidad, 18 $\frac{3}{4}c.$  to 19 $\frac{1}{4}c.$ ; Jamaica, 16 $\frac{1}{4}c.$  to 17 $\frac{1}{2}c.$ ; Dominica, 16c. to 16 $\frac{1}{2}c.$  per lb.  
COCOA-NUTS—Jamaica, \$26.00 to \$27.00; Trinidad, \$24.00 to \$25.00 per M.  
COFFEE—Jamaica ordinary, 7 $\frac{1}{2}c.$  to 8c.; good ordinary, 8 $\frac{1}{4}c.$  to 8 $\frac{3}{4}c.$ ; Rio No. 7, 6 $\frac{3}{4}c.$  per lb.  
GINGER—Small to bold dark root, 14 $\frac{3}{4}c.$  to 15 $\frac{1}{4}c.$ ; small to bold bright, 15 $\frac{1}{2}c.$  to 16c. per lb.  
GOAT SKINS—Jamaica, 58c; Antigua, and Barbados, 57c.; St. Kitt's, St. Thomas, and St. Croix, 50c. to 51c. per lb.  
GRAPE FRUIT—Jamaicas, \$6.00 to \$8.00 per barrel; \$3.00 to \$4.00 per box.

LIMES—\$7.00 to \$8.50 per barrel.

MACE—27c. to 39c. per lb.

NUTMEGS—95's to 100's, 16 $\frac{1}{2}c.$ ; 100's to 110's, 12c.; 130's to 140's, 11c.; broken and shrivels, 7c. to 7 $\frac{1}{2}c.$  per lb.

ORANGES—Jamaica, \$2.50 to \$3.00 per box; \$5.00 to \$6.00 per barrel.

PIMENTO—5 $\frac{1}{4}c.$  per lb.

SUGAR—Centrifugals, 96°, 3.875c. to 3.92c.; Muscovados, 89°, 3.375c. to 3.42c.; Molasses, 89°, 3.125c. to 3.19c. per lb., duty paid.

## INTER-COLONIAL MARKETS.

**Barbados**,—May 18, 1907.—Messrs. T. S. GARREWAY & Co., and Messrs. JAMES A. LYNCH & Co., May 23.

ARROWROOT—St. Vincent, \$4.00 to \$4.75 per 100 lb.

CACAO—Dominica, \$18.00 per 100 lb.

COCOA-NUTS—\$14.00 per M. for husked nuts.

COFFEE—\$10.00 to \$10.50 per 100 lb.

HAY—\$1.20 to \$1.30 per 100 lb.

MANURES—Nitrate of soda, \$65.00; Ohlendorff's dissolved guano, \$55.00; Cotton manure, \$42.00; Cacao manure, \$42.00 and \$48.00; Sulphate of ammonia, \$75.00; Sulphate of potash, \$67.00 per ton.

MOLASSES—16c. per gallon.

ONIONS—Antigua, strings, \$2.00 to \$2.50, loose, \$2.00; Tenerife, bunched, \$2.50; Bermuda, \$1.40 to \$1.75 per 100 lb.

POTATOS, ENGLISH—\$2.40 to \$2.75; Canadian, \$2.40 to \$2.75 per 160 lb.

PEAS—Split, \$5.75; Canada, \$3.10 per bag.

RICE—Demerara, \$5.65; Ballam, \$5.96 per bag (190 lb.); Patna, \$3.75; Rangoon, \$3.00 per 100 lb.

SUGAR—Dark crystals, \$2.25 to \$2.30; Muscovado, \$1.80 to \$1.85 per 100 lb.

SYRUP—17 $\frac{1}{2}c.$  per gallon.

**British Guiana**,—May 11, 1907.—Messrs. WIFTING & RICHTER.

ARROWROOT—St. Vincent, \$11.00 per barrel.

BALATA—Venezuela block, 32c.; Demerara sheet, 48c. per lb.

CACAO—Native, 17c. to 18c. per lb.

CASSAVA—No stock.

CASSAVA STARCH—\$6.00 per barrel.

COCOA-NUTS—\$12.00 to \$16.00 per M.

COFFEE—Creole, 14c. to 15c.; Jamaica, 14c. per lb.

DHAL—\$5.25 to \$5.50 per bag of 168 lb.

EDDOS—60c. to 96c. per barrel.

MOLASSES—16c. per gallon.

ONIONS—Lisbon, 4 $\frac{1}{2}c.$  and 5c. per lb.

PLANTAINS—20c. to 60c. per bunch.

POTATOS, ENGLISH—Nova Scotia, \$2.80 to \$3.00 per barrel.

POTATOS, SWEET—Barbados, \$1.20; Creole, \$1.20 per bag.

RICE—Ballam, \$5.90 per 177 lb.; Creole, \$4.75 to \$4.80 per bag (ex store); Seeta, \$5.50 to \$6.00; Patna, \$5.00 per bag.

SPLIT PEAS—\$5.80 per bag (210 lb.).

TANNIAS—\$1.92 per bag.

YAMS—White, no quotations; Buck, \$2.76 per bag.

SUGAR—Dark crystals, \$2.40 to \$2.50; Yellow, \$2.75 to \$2.90; White, \$3.60 to \$4.00; Molasses, \$1.75 to \$2.00 per 100 lb. (retail).

TIMBER—Greenheart, 32c. to 55c. per cubic foot.

WALLABA SHINGLES—\$3.00 to \$5.75 per M.

**Trinidad**,—May 11, 1907.—Messrs. GORDON, GRANT & Co.

CACAO—Ordinary to good red, \$18.75 to \$19.00; estates, \$19.25 per fanega (110 lb.); Venezuelan, \$18.75 to \$19.25.

COCOA-NUTS—\$21.00 per M., f.o.b.

COCOA-NUT OIL—90c. per Imperial gallon (cask included).

COFFEE—Venezuelan, 8c. to 8 $\frac{1}{2}c.$  per lb.

COPRA—\$4.00 to \$4.15 per 100 lb.

DEAL—\$4.40 to \$4.60 per 2-bushel bag.

ONIONS—\$3.00 to \$4.25 per 100 lb. (retail).

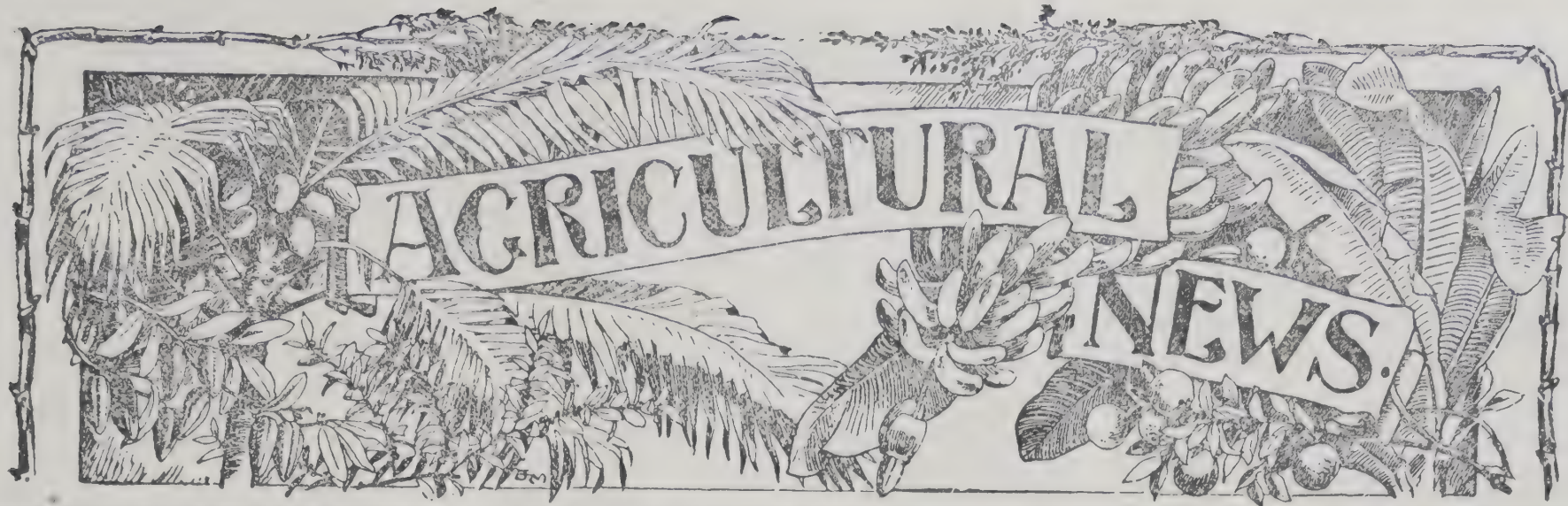
POTATOS, ENGLISH—\$1.50 to \$2.50 per 100 lb.

RICE—Yellow, \$5.50 to \$5.65; White, \$5.75 to \$6.00 per bag.

SPLIT PEAS—\$5.40 to \$5.50 per bag.

SUGAR—Crystals, \$2.00 to \$2.50 per 100 lb.





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## Canadian Exhibitions, 1907.

S announced elsewhere in these columns, the National Exhibition at Toronto is to be held this year from August 26 to September 9, and the Nova Scotia Provincial Exhibition is to be held at Halifax from September 25 to October 9. It may be mentioned that both these

exhibitions are largely assisted by the Dominion Government, and are visited by manufacturers, produce merchants, and others from all parts of Canada, as well as from the United States.

In view of the very considerable trade that is being carried on between the West Indies (including British Guiana) and the Dominion of Canada, it is desirable that the productions of these colonies should continue to be well represented at both the exhibitions above referred to.

During the year ended June 30, 1906, the total volume of the trade carried on between Canada and the West Indies was of the value of £2,243,215. Sugar and molasses are the products which figure most prominently in the list of imports into Canada from these colonies. The total value of these amounted to £1,406,733. An interesting feature in the trade in 1906 was the increase in the value of the fresh fruit imports from the West Indies, amounting to £23,746 as compared with £16,313 in 1905.

It has been abundantly proved that the exhibitions held in Canada form the very best means of bringing the products and resources of the West Indies before the people of the Dominion, and in view of the recent visit to this part of the world of the Canadian Trade Delegation, and the valuable report presented by the Delegation on its return, there can be no doubt that the present is a very favourable opportunity for making further efforts to bring about closer commercial relations between Canada and the West Indies.

In regard to the general feeling existing in the West Indies on this point, we may quote the following from the report of the Delegation, which was partly



reproduced in a preceding number of the *Agricultural News* (Vol. VI, pp. 164-5):—

‘At the different points, the delegates were met by representative business men and others of the community, who gave them full details of trade, and other valuable information on all points. From the expression of friendship and goodwill given utterance to, we were shown plainly that they are desirous of giving Canada the fullest possible share of their trade. In every place we were extended the most unbounded hospitality, and shown every social and other attention.’

As already pointed out, the exhibits proposed to be sent to the Canadian exhibitions from these colonies are to consist solely of commercial samples, and not of curios, or fancy articles. A large proportion of the samples will be placed in neat, wooden boxes, with sliding glass tops, so that those interested may have easy access to the contents, and be able to examine them at their leisure. It is proposed that none of the exhibits should be returned, as those remaining in good condition after the exhibitions are over, are to be distributed to the various Boards of Trade in Canada, to be tested and examined on their merits as compared with the productions of other countries.

It is gratifying to learn that, this year, practically all parts of the West Indies will join in sending representative collections to the Canadian exhibitions, and by the aid of the newly formed Permanent Exhibition Committees, it is hoped that the exhibits will, in each case, be accompanied by full particulars as to their origin, shipping marks, the quantities available, and, as far as possible, the values at the port of shipment. Every sample sent should be capable of being opened and tested by those specially interested in them. In fact, it is proposed that nothing shall be wanting to render the West Indian exhibits at the Canadian exhibitions of the highest commercial value.

As showing the interest taken in previous representations of the West Indies at the Canadian exhibitions, under the heading ‘The Wealth of the West Indies’ a leading Canadian paper had the following:—

‘One of the most instructive and interesting exhibits at the Toronto Exhibition was that of West Indian products. It contained upwards of 2,500 examples of the agriculture and manufacture of the Caribbean Archipelago.’

Furthermore, the West Indian exhibit at the Dominion Exhibition held at Halifax last year was described by another leading paper as arranged in

a very attractive manner and as being ‘one of the finest at the show.’ It was added that ‘this is the first time the people of the Maritime Provinces have had an opportunity of seeing the principal products of the West Indies grouped together.’

In the public telegrams received in the West Indies on October 10, 1906, there appeared the following:—

‘The Canadian papers to-day speak in the highest terms of the display of the West Indian products at the Toronto and Halifax Exhibitions which have just closed. The Grand Gold Medal has been awarded for the exhibition as a whole, and an additional gold medal for Jamaica cigars. The most representative and attractive of the exhibits were from British Guiana and Barbados, and following closely were excellent exhibits from Grenada, Dominica, Antigua, and St. Kitt’s. A fine trophy of arrowroot put up in attractive packets was sent from St. Vincent, and an interesting collection of preserved fruit from the Norbrook factory at Jamaica.’

‘At the recent meeting in the Board of Trade rooms, the opinion was expressed that it was desirable that further efforts should be made to bring about closer relations between Canada and the West Indies. The striking fact was elicited that out of 200,000 tons of sugar that entered Canada last year, 160,000 tons, or four-fifths of the whole, were received from the West Indian Colonies.’

The following extract is taken from *The Maritime Merchant* of May 16:—

‘Well-wishers of the West Indies are well pleased to note the great revival of interest being taken in these colonies both by Canada and the Mother Country. This renewed interest is due largely to the better knowledge resulting, in part, from such delegations as have visited the West Indies, within the past year.’

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## TREATMENT OF MILCH COWS.

Where a good milk supply is desired, the treatment of milch cows is a subject that deserves more careful consideration than it usually receives, especially during the prevalence of dry weather.

It would be advantageous if, in addition to good grazing or supplies of green fodder consisting of ratoon shoots of maize and sugar-cane, each cow were given a mash about mid-day. This mash might consist of 1 lb. each of pollard, corn meal and cotton-cake-meal, well mixed with 1½ to 2 gallons of water, with salt added. The cost of this should not exceed about 5c. (2½d.) per day.



## SUGAR INDUSTRY.

### Cane B. 147.

The Hon. Thomas D. Foote, one of the oldest of the leading planters in Antigua, recently forwarded specimens of plants, as well as first and second ratoons of seedling cane B. 147, for the inspection of the Imperial Commissioner of Agriculture.

Amongst the plants were two fine specimens of B. 147, second ratoons, twelve months old, from Vernons Estates, Antigua, grown without manure. It was stated that the first ratoons had been sold to the factory, and gave nearly 17½ tons of canes to the acre. Mr. Foote adds: 'At present, I have been planting B. 147 for the past twelve years, and have steadily increased the quantity each year. Now I have 200 acres under cultivation in that cane.'

### Sugar in British Guiana.

The following extracts, dealing with the sugar industry of British Guiana, have been taken from the summary of Professor J. B. Harrison's address on British Guiana and its resources, read before a meeting at the West India Committee Rooms on April 25, that was given in the *West India Committee Circular* of May 7:—

At present the sugar-cane with its products was the most important of the agricultural resources. In round figures the colony exported yearly about 114,000 tons of sugar, 3,600 casks of molasses, 2,500,000 gallons of rum, and 12,000 tons of cattle food prepared from products of the sugar-cane. Like many other sugar-cane-producing countries, the sugar-cane in British Guiana had suffered a good deal in late years from fungus diseases. As a consequence, the Bourbon cane, the source of the far-famed 'Demerara Crystals' had fallen off in its yields, and persistent efforts had been made to obtain an equally satisfactory variety from seed. This had been attended with a large measure of success as far as obtaining varieties which yielded more heavily than the Bourbon now did, and which would flourish, for some years at any rate, on soils on which the Bourbon would not now grow. But a variety which approached the Bourbon as a source of high-class sugar had not yet been secured.

In the year 1899, not more than 550 acres were occupied by new varieties in the colonies; in 1906, about 20,100 acres were planted with them, and probably some 25,000 acres were under them at the present time. The records obtained and published by the Board of Agriculture showed that new varieties of sugar-cane had given, over large areas, mean results of 8, 10, 22, and 35 per cent. higher than the mean returns obtained from the Bourbon during the five years 1901-5. About 20 per cent. of the area occupied with seedling varieties was under kinds imported from Barbados, and which were there raised by Mr. J. R. Bovell; while about 80 per cent. was under varieties raised in British Guiana.

The cultivation and manuring of the sugar-cane in British Guiana were then briefly described, and the opinion expressed that under equal conditions of fiscal treatment British Guiana's resources for cane growing were equal to those of any other country. The industry was one which economic conditions had compelled to be one almost solely for large capitalists and wealthy companies.

### Sugar-Cane in Porto Rico.

The annual *Report* of the Porto Rico Experiment Station for 1906, containing a review of the work that has been done toward improvement in agricultural practice in Porto Rico during the last year, states that the central factory system of sugar manufacture has supplanted the small mills with their open kettles and low extraction.

Mr. D. W. May, Special Agent-in-charge of the Experiment Station writes the following:—

The planting of sugar-cane in the island has been largely increased during the year. This increase in the area under sugar has taken place almost entirely in the low ground skirting the coast line. There is however, an extension also among the first range of low hills; and in sections where the rainfall is abundant, and the soil fairly fertile, very good canes are produced on such lands.

The 'central system' is growing, and new mills of large capacity have been installed, while those already established have increased their machinery. Several lines of experiment should be carried out with cane, but as this crop is an expensive one to deal with, and the funds of the station are limited, not much can be undertaken. The station is planting some improved canes of the island, and has also introduced the most promising canes of the Imperial Department of Agriculture at Barbados, kindly sent by Sir Daniel Morris, Commissioner-in-charge. It is estimated by the British Department that the yields from these improved canes have increased the output of sugar on the same area by about 25 per cent.

Doubtless an equal increase can be obtained by planting improved canes in Porto Rico. A collection of the best canes from experiments carried on at the Louisiana Station, Audubon Park, has been very kindly sent by Professor R. E. Blouin. Some of these canes have proved very good indeed for Porto Rico conditions, and a number of them, as well as other canes, have been sent out to representative planters in various sections for further tests. Each planter must study for himself the proper manuring of sugar-cane, as there is quite a variation in both the chemical and physical composition of the soils planted with this crop.

A scheme for testing the requirements of the cane by a system of  $\frac{1}{10}$ -acre plots has been outlined by the station, and a number of planters in different sections of the island have taken it up, and are making an extended study of its requirements. A number of more progressive planters have a small portion of their estates devoted to experiments in cane production, this proving of great interest and value.

### GLASS BUTTER CHURNS.

Small glass butter churns, supplied by Messrs. Crump & Perrier, 25 Barrington Street, Halifax, Nova Scotia, have been under trial for nearly twelve months by correspondents of this Department, and they are reported to be most convenient and effective. The churns are supplied in four sizes, from 1 quart to 4 quarts. The prices, including packing and freight prepaid at any port in the West Indies touched at by the Pickford & Black steamers are as follows:—1 qt., \$1.75; 2 qt., \$2.00; 3 qt., \$2.30; 4 qt., \$2.75. Orders, accompanied by a remittance, may be forwarded to Messrs. Crump & Perrier at the address given above.



## CANADIAN EXHIBITIONS, 1907.

The following information will be of interest to the members of the Permanent Exhibition Committees who will be entrusted with the arrangements for bringing together, and shipping, representative collections of the Products of the West Indies for the Exhibitions to be held in Canada during 1907.

The Toronto National Exhibition will open on August 26, and the Halifax Exhibition on September 25.

The efforts in connexion with the Canadian Exhibitions this year will be of special interest, considered in relation to the visit of the Board of Trade Delegation to the West Indies in February and March last, and the valuable Report which has lately been presented on the return of the Delegation to Canada.

It is anticipated that all the West Indies will join in sending representative collections to illustrate their varied and valuable resources, and place their productions before the people of Canada in a thoroughly attractive and interesting manner. It is understood that the chief object in view is to increase the trade relations between the Dominion of Canada and the West Indies. To carry this out, the specimens selected should consist of *bona fide* commercial samples put up so that each one may be capable of being handled and tested by those interested, and they should be accompanied by full particulars as to their origin, shipping marks, the quantities available, and, as far as possible, the prices f.o.b. at the port of shipment.

### TORONTO NATIONAL EXHIBITION.

The members of the Permanent Exhibition Committees will bear in mind that, in order to carry out their arrangements in a satisfactory manner, it is desirable that they should meet at an early date for the purpose of discussing details. One of the first matters to be dealt with is to obtain a supply of bottles for liquids and cured articles, as well as a number of neat boxes with sliding glass tops, for holding samples of dried produce, so that visitors may have access to them and be able to examine their contents at leisure.

While the bottles and boxes are in course of being obtained, the committees might issue circulars and use their personal influence with the view of securing the hearty co-operation of members of the planting community and others in contributing samples of produce, and care should be taken to see that these packages are delivered in good time to admit of their being packed and shipped on the dates given below.

The Toronto National Exhibition will open on August 26 and close on September 9. A convenient steamer that might be utilized for conveying the general exhibits, as well as decorative material, such as bamboo stems, dried leaves of the cocoa-nut palm, bunches of cocoa-nuts (to be strongly wired together), dried sugar-canes, etc., etc., would be S.S. 'Ocamo,' calling at St. Vincent on July 20, and at Montserrat on July 22. In the case of all the other colonies, the decorative material above referred to, as well as the general exhibits, might be shipped at a later date, viz., by S.S. 'Olenda' (or substitute) due to call as follows: British Guiana, July 26; Trinidad, July 29; Barbados, August 1; St. Lucia, August 2; Dominica, August 3; Antigua, August 4; St. Kitt's, August 6.

A later opportunity for shipping *fresh fruit and vegetables* for the Toronto National Exhibition would be by the

S.S. 'Oruro,' due to leave British Guiana on August 6; Trinidad, August 9; Barbados, August 12; St. Vincent, August 13; St. Lucia, August 13; Dominica, August 14; Montserrat, August 15; Antigua, August 16; St. Kitt's August 18. This steamer would deliver these exhibits in time to reach Toronto a few days after the Exhibition has been opened, and when the full number of visitors will be present.

### HALIFAX EXHIBITION.

In the case of the Halifax Exhibition, it has been arranged by Messrs. Pickford & Black that all the dried and cured exhibits shown at the Toronto Exhibition will be carefully repacked, and transferred in time to be shown at the Halifax Exhibition, which will open on September 25.

In addition to the exhibits above referred to, it is suggested that arrangements might be made for sending a supply of fresh fruit and vegetables, as well as any further decorative material that may be necessary, by the Canadian steamer 'Ocamo,' leaving Demerara on August 30; Trinidad, September 2; Barbados, September 5; St. Vincent, September 6; St. Lucia, September 6; Dominica, September 7; Montserrat, September 8; Antigua, September 9; St. Kitt's, September 11; Bermuda, September 16; and arriving at Halifax on September 19.

### SELECTION OF EXHIBITS.

As already stated, the exhibits proposed to be sent to the Canadian Exhibitions are to consist solely of commercial samples, and not of curios, or fancy articles. The decorative material referred to above is to be utilized for making the courts attractive, and for the purpose of suggesting the tropical conditions under which the crops of the West Indies are produced. In the case of sugars, rum, molasses, preserves, honey, cacao, coffee, arrowroot, cassava, dried ginger, cashew nuts, dried peppers, cotton, starches, oils, India rubber, etc., all these will require to be carefully put up in closely fitting glass jars and bottles. In addition it would be useful if some of the dried products were also forwarded in small boxes (about 1 foot cube) with sliding glass covers, as suggested above.

It should be understood that none of the exhibits will, under any circumstances, be returned. Those remaining in good condition after the two Exhibitions are over will be distributed to the various Boards of Trade in Canada, to be tested and examined by those directly interested in them.

### LABELLING EXHIBITS.

It would be useful if, in the first instance, a number were attached to each exhibit, and a list forwarded so that in the event of the labels being damaged, the name of the exhibit could be attached at the exhibition. On application to the Imperial Commissioner of Agriculture, samples of labels would be forwarded, with the cost of printing in each case. It would be desirable, for the purpose of preservation, if the labels could be covered with a colourless varnish similar to that described in the *Agricultural News*, Vol. V, p. 101. In all cases the labels should be as descriptive as possible, and bear also the shipping marks of the estate from which the sample has been obtained. A quantity of blank labels should be forwarded to Messrs. Pickford & Black to replace any that may have been lost or damaged in transit. It is important to bear in mind that the labels should be placed near the



bottom of the bottle and not in the middle, in order that the contents may be fully in view.

PACKING EXHIBITS.

In packing glass jars and bottles, it is advised that they should all be carefully inspected before shipment in order to detect leakage. It should also be borne in mind that they will be liable to be knocked about in transit; each bottle should, therefore, be carefully isolated by being packed with straw, shavings, or sawdust.

The bottles containing liquids should, if possible, be packed by themselves and not in the same case with cured and dried produce, such as cacao, starches, etc.

Fresh fruits and similar articles, which it is proposed to exhibit in glass jars, should be placed in a solution of formalin (4 per cent.). This can be made by adding 10 parts by weight of commercial formalin to 100 parts of water.

SHIPPING ARRANGEMENTS.

As already mentioned, Messrs. Pickford & Black have undertaken to carry all exhibits from the West Indies free of charge. These should be ready for shipment the day before the steamers are due at each port. Each case should be marked 'Canadian Exhibitions' followed by 'Exhibits from———' (mentioning the name of the colony) and addressed to 'Messrs. Pickford & Black, Halifax.' Full particulars respecting the number and marks, and the contents of each case should be forwarded to Messrs. Pickford & Black by the same steamer as the exhibits.

An extract from the latest Time Table issued by the Canadian Steamship Co. Ltd., for the months of July, August and September next is given below :—

	S.S. 'Olenda'	S.S. 'Oruro'	S.S. 'Orinoco'	S.S. 'Ocamo'
Leave Demerara	July 26.	Aug. 6.	Aug. 19.	Aug. 30.
„ Trinidad	„ 29.	„ 9.	„ 22.	Sept. 2.
„ Barbados	August 1.	„ 12.	„ 25.	„ 5.
„ St. Vincent	—	„ 13.	—	„ 6.
„ St. Lucia	„ 2.	„ 13.	„ 26.	„ 6.
„ Dominica	„ 3.	„ 14.	„ 27.	„ 7.
„ Montserrat	—	„ 15.	—	„ 8.
„ Antigua	„ 4.	„ 16.	„ 28.	„ 9.
„ St. Kitt's	„ 6.	„ 18.	„ 30.	„ 11.
„ Bermuda	„ 11.	„ 23.	Sept. 4.	„ 16.
Arrive Halifax	„ 14.	„ 26.	„ 7.	„ 19.

NOTE.—S.S. 'Ocamo' will call at St. Vincent on July 20 and at Montserrat on July 22.

AGRICULTURE IN THE BAHAMAS.

The *Bulletin* of the Agricultural Department, Bahamas, for April, 1907, contains the report of the Board of Agriculture, and the Curator's reports for the year ended December, 1906.

The inspection of fruit and sisal has received the attention of the Board, with a view to preventing the shipment of poor and badly graded fruit and poorly cleaned sisal to foreign markets, and experiments in the cultivation and curing of tobacco, and in the cultivation and manuring of pine-apples are being conducted. The Board suggests that the roads might be extended and improved in the Out Islands. Substantial improvement in the development of these Islands might then take place, as the people throughout the whole Colony are showing an increasing interest and confidence in agriculture.

A plot of broom corn at the Experiment Station gave an estimated weight of heads of 624 lb. per acre. It is thought that broom corn cultivation and broom making might form a fairly lucrative minor industry, and should be taken up, at first experimentally on a small scale.

Citrus fruits can be successfully grown in the Bahamas, but care must be taken with reference to the kinds cultivated, as many of the Bahama varieties of grape fruit are considered worthless. A citrus grove has been laid out at the Experiment Station to make a thorough trial of the merits of the different varieties.

Experiment plots of Sea Island cotton were planted from seed purchased from and supplied by the Imperial Department of Agriculture, and others with seed obtained from America. The total weight of seed-cotton reaped from one plot was equal to 472 lb. per acre, and the lint was valued in November last at 22d. to 24d. per lb. This would indicate that Sea Island cotton might be given an extended trial in the Bahamas, but the fear of the cotton stainer prevents a large number of planters from taking up the cultivation in Long Island and Exuma.

Tobacco of a good quality was grown in an experimental plot from Havana seed. The texture, aroma, colour of the leaf, and the burning quality were good, and the average price realized at public auction in Nassau was 1s. 5d. per lb.

The prospects of sisal are most encouraging, and 25,000 acres are now under cultivation. It is expected that a rapid advance in planting more sisal will shortly be made. The fibre produced is of good quality and strength, but some of it is short and badly cleaned. During the greater part of the year, 6c. per lb. was obtained for hand-cleaned fibre, and 8c. to 9c. for machine cleaned.

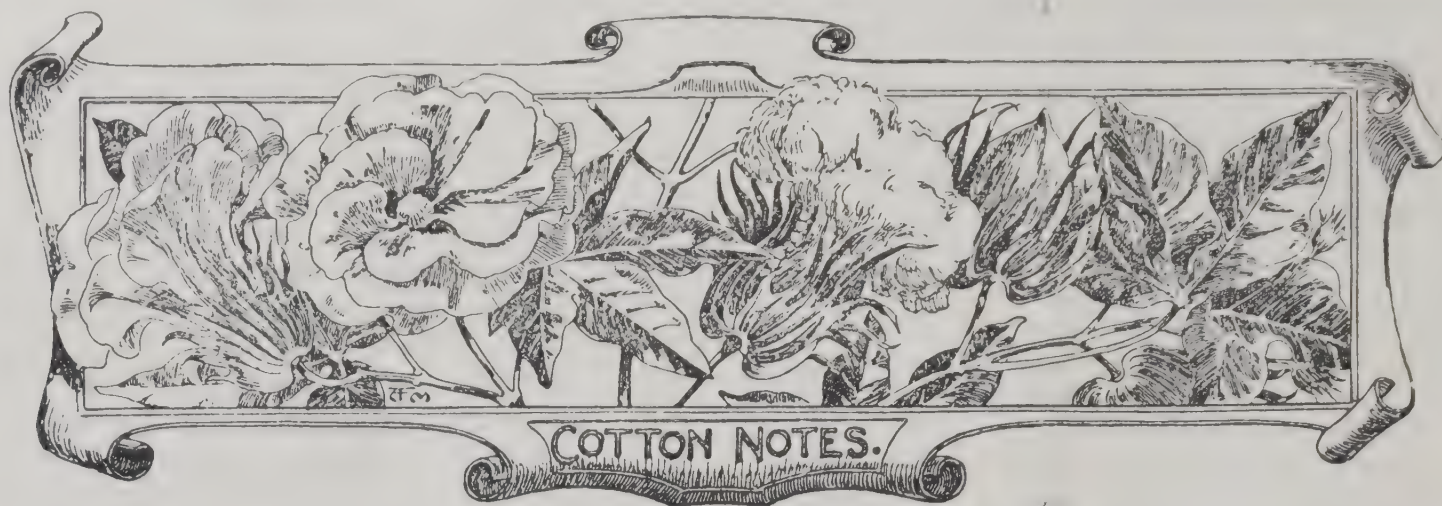
Onions are cultivated in the Out Islands, and the industry is developing, while steady progress is being made with the cultivation of cassava, bananas, corn, etc.

WOOD OF THE DOWN TREE.

An inquiry has recently been received by the Imperial Department of Agriculture for as large a supply as possible of the wood of *Ochroma Lagopus*, the Down tree of the West Indies. This tree is found, to a moderate extent, in damp situations in the lower hills of Jamaica, St. Vincent, and Trinidad. Correspondence on the subject is invited by the Imperial Commissioner of Agriculture with particulars as to the quantity available, and the price f.o.b. at the port of shipment. A good specimen of the wood might also be sent.

**Inoculation of Leguminous Plants** was the subject of a paper read by Prof. W. B. Bottomley before the Linnean Society of London on April 18. Results of experiments on tares, both in the pot and also in the field, were in favour of inoculation.





### WEST INDIAN COTTON.

Messrs. Wolstenholme & Holland, of Liverpool, write as follows, under date of May 17, in regard to the sales of West Indian Sea Island cotton:—

A fair business has been done in West Indian Sea Island descriptions since our last report, but this was confined chiefly to Antigua, St. Vincent, and St. Croix.

Spinners are indifferent buyers unless they obtain a distinct concession, and prices are easier.

The sales include St. Kitt's at 22½d.; St. Croix, 20d. to 22½d.; Antigua, 22d. to 26d.; Barbados, 22½d.; and a considerable quantity of St. Vincent stains at 8d. to 12d.

### COTTON PROSPECTS IN THE SEA ISLANDS.

Messrs. Henry Frost & Co's. Sea Island report of May 18, has the following in regard to the next crop:—

The weather has continued unseasonably cool with too much rain during the past week, which is not favourable to the young plant, or to the germinating of the late replanting. The cotton has not been thinned to a stand in many sections, especially so on the Sea Islands of Carolina, and warm, dry weather is much needed. The crop has rather been retarded during the week, and it continues to be three weeks to a month late. This will imperil the bottom fruit, without which it is impossible to make a good yield.

The report of May 25 states that:—

For the past week we have been having more seasonable and settled weather. In Carolina, with the exception of some few localities, stands have been obtained, and the crop, although about three weeks late, has made a start, and its progress from now on will depend on weather conditions. Our advices from Georgia and Florida are that, with the exception of being three weeks late, the crop has improved and is now doing fairly well.

### COTTON INDUSTRY IN ST. VINCENT.

In order that small growers of Sea Island cotton in St. Vincent may be enabled to plant the best seed, the Imperial Department of Agriculture is prepared to supply specially selected and disinfected seed, of good germination, at 5c. per lb.

Should growers have already obtained unselected seed, it will be selected and disinfected for them at 2c. per lb. All payments must be made before delivery of the seed.

Only seed from the best marks should be planted if growers are desirous of obtaining the highest prices. It is also of the greatest importance that all seed should be carefully selected and disinfected.

### COTTON GROWING AT BARBADOS.

'CATCH' CROP AND 'ROTATION' CROP.

In reference to a paragraph in the *West India Committee Circular*, p. 41 (January 15, 1907), stating that it was not expected that much cotton will ultimately be grown in Barbados, except as a 'catch' crop on sugar estates, it is desirable to point out that only in very few instances has any cotton been grown as a 'catch' crop in this island. A large proportion of the crop is grown as a 'rotation' crop.

In order to explain a purely technical matter of this sort, it may be mentioned that what is known in Barbados as a 'catch' crop is one that is grown between two crops of sugar-cane, when the land is proposed to be replanted in sugar-canes *in the same year*. A 'rotation' crop, on the other hand, is a crop grown on land where canes are not to be replanted in the same year.

In the case of a 'catch' crop, the cotton would only occupy the land for a few months; whereas, in the case of a 'rotation' crop, it would be on the land for nearly, if not quite, a year, and thus admit of several pickings of well-matured fibre. In many cases at Barbados, as also at Montserrat, Antigua, and Nevis, cotton is also grown as a main crop, that is quite independent of the sugar or any other crop. The prospects of growing cotton as a main crop are distinctly promising.

### COTTON IN PORTO RICO.

Sea Island cotton can be grown in Porto Rico, but it is stated by Mr. D. W. May, Special Agent-in-charge of the Porto Rico Agricultural Experiment Station, in his *Report* for 1906, that so far small progress has been made in the extension of this crop.

The cotton plant grows readily in all parts of the island, but every district is not adapted to its profitable production. The heavy rainfall, extending through the greater part of the island, is not conducive to the ripening of the bolls, or to the picking and drying of the cotton, and may prevent cotton-growing from becoming a large industry. In many parts, however, it is thought that cotton should do well if planted so as to ripen during the dry season, and should be especially recommended to small proprietors, who, with the help of their family, can make it a very profitable industry.

There is no boll weevil in Porto Rico. The cotton worm is the only serious insect pest, and this can be kept in check by well-known means, provided the planter is vigilant and ready to apply his remedies at the first appearance of the worms.



## SEASONABLE NOTES.

Planters no longer hold to the opinion that good crops can be grown on the poorest soil, or that they can be produced without special care and attention, for experience has clearly shown that cotton is a crop which requires the best land, and a most intelligent and constant supervision in order to give a satisfactory return.

In deciding then upon the area he will allot to cotton, the planter should first take well into consideration his supply of available labour, and also the amount of attention and supervision he will be able to give to the crop. In this connexion it must not be forgotten that every part of the cultivation should be well and carefully done, and, what is more, done at the proper time. A small acreage with proper supervision and sufficient labour will undoubtedly give a more satisfactory return than a larger area which demands more attention and labour than the planter can spare.

Another point calling for attention is the selection of the cotton seed, and this should be done with care, for good results cannot be expected if inferior seed is used. The Imperial Department of Agriculture has made arrangements, by which it is able, as in past years, to supply planters with the best seed at the lowest possible price. This seed can be obtained from the officers of the Department in the various islands, and it is hoped that planters will avail themselves of this opportunity, and not use the first seed that comes to hand, irrespective of plants from which it has been obtained. It should again be recommended, before planting, that care be taken to have the land in good tilth, to have the seed bed thoroughly prepared, to let it 'cool out' well, and, after putting in the seed, to keep a careful watch upon the young crop, and see that no detail of good cultivation is wanting that may encourage or improve its growth.

## COTTON IN THE VIRGIN ISLANDS.

Reference was made in a previous number of the *Agricultural News* (Vol. V, p. 281) to the establishment of a small cotton factory at the Experiment Station, Tortola, where the cotton grown by the peasantry is bought, ginned, and shipped to England.

A report recently forwarded by Mr. W. C. Fishlock, Agricultural Instructor, on the working of the factory from November 1, 1906, to March 31, 1907, would indicate that the undertaking is financially sound, and that steady progress is being made in establishing a cotton industry in the Virgin Islands.

The crop commenced on November 1, 1906, and, during the period under review, 20,700 lb. of seed-cotton were purchased at the factory. The sum paid amounted to £176 11s. 5d. and was distributed as follows:—

	£	s.	d.
Tortola, etc.	—	—	— 30 8 11
Virgin Gorda	—	—	— 118 2 11
Anegada	—	—	— 27 19 7
	£176	11	5

This is an increase of £28 16s. 6d. over the sum paid for seed-cotton from August 1, 1905, to May 31, 1906, and it is probable that the value of the lint sent from the factory during the period under review will exceed the value of the lint exported last year by about £35.

## DISINFECTION OF COTTON SEED.

Reference to the desirability of disinfecting cotton seed before planting, with a view to the destruction of all fungus spores attached to the seed coats, has repeatedly been made in previous numbers of the *Agricultural News* (Vol. V, p. 119; Vol. VI, pp. 162 and 174). This is a most important question, and as the selected cotton seed supplied by the Imperial Department of Agriculture during the coming season will *not* have been disinfected beforehand, it is recommended that the planter himself should carefully attend to disinfection a short time before the seed is to be sown.

Anthraxnose is probably the most serious fungus disease that attacks cotton in the West Indies. It is produced by a fungus (*Colletotrichum gossypii*), that may cause considerable damage when it attacks the bolls of mature plants or the seed-leaves and stems of young plants. It has been shown to occur in practically all the West India Islands in which cotton is grown, and in some, has been, at times, troublesome. It more commonly is noticed on the bolls as the 'pink-spot,' but instances have occurred which indicate that serious losses may be experienced by attacks on the young plants.

One of the known methods of spreading is by means of spores adhering to the coats of the seeds. This can be controlled by disinfection. These spores may be destroyed, and many young seedlings saved by soaking in a disinfectant the seeds which are about to be planted. The solution recommended by this Department is 1 part by weight of corrosive sublimate in 1,000 parts of water, and may be prepared approximately by dissolving 1 oz. of corrosive sublimate in 7 gallons of water.

Experiments have been carried out by officers of the Imperial Department during the past year in Antigua, Barbados, and St. Vincent, with a view to finding out what method of disinfection should be recommended to planters of cotton. The experiments in Barbados and St. Vincent have been carried out on a field scale, and therefore the results may be taken as a guide to practice.

A wooden tub should be carefully washed out, and a solution of 1 in 1,000 corrosive sublimate made up in it. This should then be covered down and allowed to stand. After a few days (say a week), when the reaction between the wood and the corrosive sublimate has finished, this solution should be run away, and a fresh supply made up by dissolving 1 oz. of corrosive sublimate to every 7 gallons of water. It is estimated that 1 gallon of the solution should be sufficient to disinfect 12 lb. of seed at a cost of a little more than 1c. The cotton seed is soaked in this solution for twenty minutes, then removed and spread in a thin layer, on a clean floor, or a clean canvas, to dry, either in the shade or in the sun. While drying, the seed should be turned several times, and when thoroughly dry it will be ready for planting, or may be put into bags and stored for some time. No seed should be planted without first being thoroughly dried. It is advisable to use a new solution for each new batch of seed.

It has been shown that it is unnecessary to wash in pure water after soaking in corrosive sublimate if the seed is not to be kept for more than a few days before planting. If the seed is to be stored for any considerable length of time, it might be advisable to wash in pure water for ten minutes after taking from the disinfectant solution.

The germination of the seeds, after disinfection for twenty minutes, would appear to be in no way affected, and, in some instances, germination has been somewhat hastened by the soaking.



## EDITORIAL NOTICES.

Letters and matter for publication, as well as all specimens for naming, should be addressed to the Commissioner, Imperial Department of Agriculture, Barbados.

All applications for copies of the 'Agricultural News' should be addressed to the Agents, and not to the Department.

*Local Agents:* Messrs. Bowen & Sons, Bridgetown, Barbados. *London Agents:* Messrs. Dulau & Co., 37, Soho Square, W., and The West India Committee, 15, Seething Lane, E.C. A complete list of Agents will be found on page 3 of the cover.

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# Agricultural News

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## NOTES AND COMMENTS.

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### Contents of Present Issue.

The editorial (pp. 177-8) gives information relative to the Canadian Exhibitions to be held this year. Further information on the same subject is given on pp. 180-1, and it is hoped that representative exhibits of West Indian products will be sent to them.

The sugar industry of British Guiana is briefly dealt with on p. 179, and some information relating to sugar-cane in Porto Rico will also be found.

A brief review of agriculture in the Bahamas is given on p. 181.

Cotton growers will find notes of interest on pp. 182-3. Particular attention is drawn to the article on the disinfection of cotton seed; the method advocated is briefly described.

Under insect notes on p. 186, directions are given for freeing cattle from ticks.

Under science notes, two short articles on West Indian woods will be found on p. 187.

On p. 189, articles of interest to keepers of poultry are given. A brief contribution on vanilla cultivation in East Africa is also given.

Reports of meetings of cotton growers at Antigua, and at Montserrat, to consider the best methods of dealing with insect pests and fungus diseases of cotton, are given on p. 191.

### Silver Medal for Cotton in Tobago.

The silver medal, offered for competition by Sir Alfred Jones for the best 50 lb. of seed-cotton of the 'Sea Island' variety grown in the island of Tobago during the period May 1, 1906, to May 1, 1907, has been awarded to M. A. H. Thomas, Calder Hall. The competitors were to be growers of not less than 1 acre of cotton and sufficient seed was supplied, free of charge, by the Government, through the Curator, Botanic Station, Tobago, to plant all areas up to 2 acres. Five growers competed for the silver medal, and the samples of cotton, submitted to this Department for examination, would indicate that cotton of a good quality can be grown in Tobago.

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### Canada and the West Indies.

As another result of the recent visit of the Canadian Delegation, it may be mentioned that the Secretary, Mr. T. M. Fraser, is contributing a series of interesting articles on the West Indies and their resources to the Saturday edition of the *Toronto Globe*. The illustrations are carefully selected and come out well. Mr. Fraser's keen interest in these colonies is likely to be of great advantage to them. If, as is anticipated, the articles above referred to and the valuable Report issued by the Delegates themselves, are followed by a thoroughly representative collection of the productions of the West Indies to be shown at the exhibitions that will be held in Canada during August and September next, the results cannot fail to bring about a wider knowledge of the capabilities of the West Indies and lead to larger trade relations.

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### Cotton in Mauritius.

Seed of several different kinds of cotton was distributed throughout Mauritius in 1905 by the Director of the Station Agronomique. The crop was in nearly every case invaded by the numerous insect enemies of malvaceous plants that abound in the island. It is stated that in many instances the bolls remained stunted and partly dried up through attacks of red bugs; the bolls did not open satisfactorily, the fibres were stained, ill-developed, and of very little value.

In 1906, cotton was planted in supposed suitable soil towards the middle of February, without manure or irrigation. On the sandy tracts, the cotton failed through drought, while much of the later cotton was injured by rain.

The yields of the different varieties were carefully kept and it would appear that 'King' cotton with 137 lb., Sea Island with 136 lb., Upland with 122 lb., and 'Sunflower' with 121 lb. lint per acre are probably some of the most important varieties tried.

It is suggested that better returns would have been obtained if the seed had been planted at the time or the first rains, but it was feared that heavy rains or hurricanes might materially damage the young plants.



## Sugar in Formosa.

According to a brief article in the United States *Monthly Consular Reports* for April, there has been during 1906 an increased production of sugar in Formosa of 50 per cent. over the amount produced in the previous year, while in eight years the production has shown a growth of 90 per cent. A Sugar Bureau has been formed to make a special study of the sugarcane, with a view to improved and extended cultivation. In order to assist and encourage the growing and the manufacture of sugar, it grants bonuses and subsidies to growers and manufacturers. Irrigation and drainage works have been started and up-to-date machinery for the manufacture of sugar has been imported. The area at present cultivated is estimated at 88,000 acres, an area that is about double of what was under cultivation in 1902.

## Maize, Cacao, and Rubber in West Africa.

A series of lectures that was delivered at the Lagos Agricultural Show of 1906 by Viscount Mountmorres, Director of the Institute of Commercial Research in the Tropics, Liverpool, on the production of maize, cacao, and rubber in West Africa has been reprinted in bulletin form, as they contain hints of considerable interest. The lectures were delivered to an audience that consisted principally of native farmers and chiefs, and therefore, as stated in the prefatory note, the character of the audience necessarily determined the scope of the lectures.

It is urged that an effort should be made to preserve the type of maize or indian-corn grown in Lagos, as it is some of the finest produced, and fetches high prices. The grains are almost spherical—only very slightly flattened—quite opaque, and of a chalk-white colour, with no tinge of yellow or cream. It would appear that such is the demand for this variety that it is of the utmost importance that prompt and energetic steps be taken to save it from complete extinction.

Cacao cultivation is rapidly increasing on the Gold Coast, and the 'forastero' type appears to do the best. Much more care in cultivation and in preparation of beans for export is advocated, as it has been noticed that there has been a rapid decline in the quality of Gold Coast cacao as the output increased. Slight permanent shade is required; and a plentiful supply of temporary shade during the first year or two of the young plants' growth, such as is provided by bananas and plantains, is recommended. Pruning, manuring, eradication of diseases, insects, etc., were successively dealt with, and instructions given as to fermenting, washing, colouring, and drying of the beans.

The rubber of the West Coast is divided into two groups—the rubber trees and the so-called rubber vines. The first group is made up of *Funtumia elastica* and various species of *Ficus*; the other consists of different species of *Landolphia*, *Clitandra*, and *Carpodinus*. Tapping, coagulation, drying, etc., were dealt with, and suggestions offered as to the improvements that might be made in the native methods.

## Lectures to Planters.

In a review of the 'Lectures to Sugar Planters' issued by this Department which appears in the *International Sugar Journal* for April 1907, it is stated (p. 210) that 'the price is only 1s.; but it would be as well to remind intending purchasers that the postage abroad will amount to half that sum in addition.'

The *Sugar Journal* is not correct in the matter of postage. The work in question, including the wrapper, can be sent abroad at one-quarter and not at one-half the published price. In other words, the postage is three pence per copy, not sixpence as stated in the *Journal*.

## Cotton Seed for Planting in 1907.

During the last three years the Imperial Department of Agriculture has undertaken to supply specially selected cotton seed obtained from well grown and productive plants that had been proved to yield first-class cotton. The results of the action thus taken have been clearly shown in the generally high character of the lint produced this year, and in the exceptionally good prices that have been realized. Planters are fully aware that prices this year, ranging in some cases as high as 26d. to 31d. per lb., are exceptional and cannot be depended upon to occur again for some years. In order, however, to continue to afford assistance to cotton growers in regard to one of the most important matters connected with the success of the industry, the Imperial Department of Agriculture is prepared to supply specially selected cotton seed for planting during the months of June, July, and August at the rate of 6c. per lb. not including bags or freight.

It would be convenient if applications for such seed were forwarded (with a remittance in each case) to the chief Agricultural officers as follows:—

Hon. Dr. Francis Watts, C.M.G., Antigua (for Antigua and Montserrat); Mr. F. R. Shepherd, St. Kitt's (for St. Kitt's, Nevis, and Anguilla); Mr. John R. Bovell (for Barbados); and Mr. W. N. Sands (for St. Vincent). Applications from other colonies may be forwarded direct to the Imperial Commissioner of Agriculture, Head Office, Barbados.

It is understood that all applications will be dealt with in the order in which they are received. In view, however, of the difficulties likely to arise in some cases in meeting with suitable steamer facilities for shipping the seed, it is desirable that as long notice as possible be given before the seed is required to be delivered.

It should be borne in mind that in no instance is the seed disinfected beforehand. This is recommended to be done by the planters themselves immediately before the seed is sown. The method advocated for disinfecting cotton seed is described in this number of the *Agricultural News*, p. 183, and in the 'A.B.C. of Cotton Planting' (new and enlarged edition) pp. 85-6. The solution for steeping the seed is prepared by dissolving 1oz. of corrosive sublimate in 7 gallons of water. This quantity should be sufficient to disinfect about 80 lb. of seed at a cost of a trifle above six cents (three pence).





## INSECT NOTES.

### Cattle Ticks.

A pure-bred Ayrshire milch cow was recently imported into Barbados, and in a few weeks it was found that the animal had become badly infested by the ordinary cattle tick. The attempt to relieve the cow from the attack of this pest was so successful that the following account of the means employed is given for the information of cattle owners who may have occasion to deal with a small number of cattle troubled in a similar manner:—

A mixture of 1 gallon of cotton seed oil, 1 gallon kerosene oil, and 1 lb. flowers of sulphur was made, and then, by means of a coarse cloth, this was thoroughly applied all over the body of the cow, more especially on the tender parts, where the ticks were in greatest number.

The second application of the mixture was made two days later. From the time of the first treatment the ticks dropped away from the body of the cow in great numbers. For the first two days the ticks that fell were nearly all full-grown females, and many of these were not killed. In the natural course of events, these females would have dropped to the ground about this time for the purpose of egg laying, so that the decrease in the numbers of the attacking insects cannot be all credited to the first application of the mixture. Later, the younger ticks fell away from the cow; some of them, however, were killed by the liquid, their dead bodies remaining in place on the cow's hide. The animal was carefully groomed every day, and all ticks that fell off, or were brushed or picked off, were destroyed, and at the end of one week practically every insect had disappeared from the cow's body.

The mixture used produced a slight blistering of the skin of the animal, as was shown by the appearance of a dry flake, or dandruff, but this in no wise affected the cow. She never lost appetite or condition, and at the end of the second week after treatment, was not only free from ticks, but the blistering effects of the applied liquid had also disappeared.

This mixture is recommended by the Bureau of Animal Industry of the U. S. Department of Agriculture, for the treatment of small numbers of cattle, repeating the application two or three times weekly, during the season when ticks are usually prevalent, if the cattle are feeding on infested pasture.

### Sugar-Cane Pests.

The following paragraph, taken from the report of the Porto Rico Agricultural Experiment Station for 1906, may be of interest to the West Indian sugar planters. In many of these islands cane plants are treated in a similar manner, using Bordeaux mixture instead of lime water, with a view to reducing the amount of fungoid disease:—

The diseases and insect pests of sugar-cane are not causing the planters any serious trouble. There are, however,

a number of borers, which will in the future cause serious trouble, as cane is being planted on the same land year after year. This constant planting tends to increase disease. Experiments are now under way to determine the best methods for combating these insects. The insect that is causing the most damage to cane is the large borer, *Diatraea saccharalis*.

In planting new fields of cane, planters are advised to soak their seed cane for twenty-four hours in lime water in order to kill all borers they may contain. Some excellent results have been obtained by this method in reducing the number of insects, even on land that has already been infested. The canes that are to be planted are placed in a tub or tank, water is turned on, and several shovels of lime are thrown on top. This is allowed to stand twenty-four hours, when the canes are taken out and planted. Not only is the borer destroyed, but in comparative experiments made at the station, seed so treated sprouted more quickly, and the number of sprouts sept up was greater.

### GOVERNMENT INDUSTRIAL SCHOOL, BARBADOS.

The *Report* on the Government Industrial School at Barbados contains information respecting the Industrial School plantation, and the Summervale plantation connected with it.

The following extracts, taken from the Barbados *Agricultural Reporter* for June 4, give information, which shows that the returns from the plantations to a considerable extent balance the expenditure on the upkeep of the 'School':—

The expenditure on the Industrial School in 1906 exceeded the receipts by £1,254 11s. 2d; while the receipts at Summervale exceeded the expenditure by £649 14s. 9d. At the Industrial School plantation 23¼ acres were planted in canes for the crop of 1907, and 23½ acres for the crop of 1908. The crop reaped in 1906 gave a good return—about 2½ tons of sugar per acre. The canes for the crop of this year, 1907, are reported to be not as good as those of last year, owing to unfavourable weather conditions. Such portions of land as could be spared from the cane cultivation were planted in cotton, and good results are said to have been obtained. One piece of land, measuring 1⅔ acres, yielded, in a period of about fourteen months, seed-cotton at the rate of 1,900 lb. per acre. This is, however, admitted to be an exceptional yield. At Summervale plantation the area planted in first crop canes for 1907 was 28¼ acres, and for 1908, 30¼ acres. The canes reaped in 1906 are stated to have yielded well, although the rainfall on them was a moderate one. The first crop canes averaged 3 tons of sugar to the acre, and the ratoons a little under 1½ tons. The crop for 1907 is not so good as that for 1906, and the return is not expected to exceed 2 tons of sugar per acre. The receipts from 15 acres of cotton reaped at Summervale in 1906 are stated to have averaged approximately £15 per acre, not including the value of the seed, which was chiefly fed to the oxen. This yield was a little short of that of the year 1905. The area in cotton was extended to 31 acres. The crop was short, as a result of extremes of drought and heavy downpours of rain, and attacks of worm, aphid, scale, red maggot, mildew, etc.

'The cultivation of the plantation is to a great extent done by the boys of the institution, but they are not equal to dealing with all the work that should be done, and outside labour has to be resorted to periodically. This latter, however, in view of the recent emigration to the Canal, is becoming scarce and independent.'



## SCIENCE NOTES.

## West Indian Cedar.

The West Indian cedar, *Cedrela odorata*, L., is a near relation of the mahogany, belonging to the order Meliaceae.

It is a large forest tree of the West Indian mountains, attaining a height of 100 feet, with a long straight trunk. It has large, alternate, compound leaves, with five to ten pairs of smooth leaflets, each leaflet being from 4 to 6 inches long. The yellowish-white flowers are in terminal panicles. Each flower has a small greenish brown, five-toothed calyx; the corolla consists of five oblong petals, ribbed inside, the ribs adhering to the gynophore. The stamens number five, and the ovary also is five-celled. The capsules, which are from 1 to 2 inches long are greenish brown, ovoid, and have five slightly marked ribs. They open by five valves, which separate first at the apex, and disclose four to six pairs of winged seeds in each of the five cells. The wings are broad, and are on the side of the seed remote from its point of attachment to the capsule. A gum, which can be used for similar purposes as those for which gum arabic is employed, issues from wounds in the stem. The wood when distilled produces the scented cedrela-wood oil. The timber is pale reddish-brown, with large pores and darkly coloured, separate rays. This wood has a pleasant odour, is easy to work, and seems not to be attacked by boring insects. It is commonly used for making cigar boxes, and for the manufacture of wardrobes. The tree grows fairly quickly, there is a good sale for the wood, and it is a promising species for plantations in the mountains of the West India Islands. There are nine or more American species of *Cedrela*.

## Lignum-Vitae.

The hard, heavy wood called Lignum-vitae is produced by a tree, *Guaiacum officinale*, which is found near the coasts and in the forests of the West Indian Islands.

This tree has very thin, smooth, light-coloured bark, and grows to a height of about 50 feet, but its rate of growth is slow. The stem is about a foot in diameter. Its opposite, compound leaves are made up of two or three pairs of dark-green, shining, leathery, obliquely-ovate leaflets about 1 inch in length. The long-stalked flowers are in terminal umbelliform clusters. The sepals are five in number, and there are also five petals, of a light-blue colour, about  $\frac{1}{2}$  inch long. The stamens number ten, and the ovary consists of from two to five cells. The yellowish leathery fruit is usually two-celled, with one seed in each cell. The bark is generally about  $\frac{1}{4}$  inch in thickness, is very hard, and has a density one and a half times as great as water; as a consequence of which it sinks when placed in the liquid. The sapwood is yellow, and sharply defined from the heart-wood. The latter is dark-brown, streaked with black, and marked by lines of green resin. The pores are small, and mostly full of resin; the rays are very fine and numerous, and the rings usually marked by pore zones. The wood is used for pulley blocks, rollers, handles, policeman's batons, sleigh shafts, shuttles in cotton weaving, etc. The resin from the heart-wood was much used in medicine in the sixteenth century, and still has a place in the pharmacopoeia. This resin turns blue on being treated with an oxidising agent, and because of its possession of this property it is employed as a chemical reagent. Two other species of *Guaiacum* furnish Maracaibo and Bahama Lignum-vitae respectively.

## RIND DISEASE OF THE SUGAR-CANE.

An address on rind disease and other related stem diseases of the sugar-cane, delivered before the Hawaiian Sugar Planters' Association by Mr. L. Lewton-Brain, B.A., F.L.S., (formerly Mycologist on the staff of this Department), has been issued as *Bulletin 7* of the Division of Pathology and Physiology of the Experiment Station maintained by that Association.

The rind disease is caused by *Melanconium sacchari* and is well known in the West Indies, where the cultivation of the Bourbon cane has had to be abandoned through its susceptibility to attacks of this fungus, and planters in Hawaii recognize that it is a disease of importance.

The 'red-rot' disease of the sugar-cane is caused by *Colletotrichum falcatum*, and is seen when an attacked cane is cut longitudinally. The diseased parts are red, and have a distinct acid smell; the red colour appears in blotches and is not evenly spread through the tissues.

Mr. Lewton-Brain is of opinion that *Melanconium* is a true wound parasite and is the direct cause of rind disease, for his experiments in no way support the view that *Colletotrichum* is the parasitic fungus that causes rind disease, with *Melanconium* as a relatively unimportant follower. *Colletotrichum* causes the 'red-rot' disease, a disease quite distinct from the rind disease.

Rind disease is spread by the spores of the fungus produced in abundance on 'rotten' canes, and therefore this source of infection should be removed by the destruction of all diseased canes. The prevention of wounds, the selection and disinfection of cane cuttings, and the choice of resistant varieties of sugar-cane were briefly touched upon, as indicating the remedial measures against this disease.

## NEVIS AGRICULTURAL SHOW.

In continuation of the brief note in the *Agricultural News* (Vol. VI, p. 139) in reference to the Agricultural Show recently held at Nevis, the Hon. C. Arthur Shand forwards the prize winners:—

Best Milch Cow—prize by his Excellency the Governor—Matilda Bartlett.

Best Collection of Vegetables—prize by his Honour the Administrator—James Brown.

Peasant Proprietor winner of largest number of prizes—prize by Secretary of West India Committee—First, James Roper; Second, Ellen Chapman.

Seed-cotton—Wesleyan School, Gingerland.

Cotton Lint—First, J. Croney, Old Manor estate, Gingerland. Second, Miss Van Engle, Pot Work estate.

Diplomas of Merit presented by the Imperial Department of Agriculture to—

1. Maddens estate for the best bull.
2. W. Nanton for the best gelding.
3. H. C. Huggins for the best boar.
4. Alice Scarborough for winning

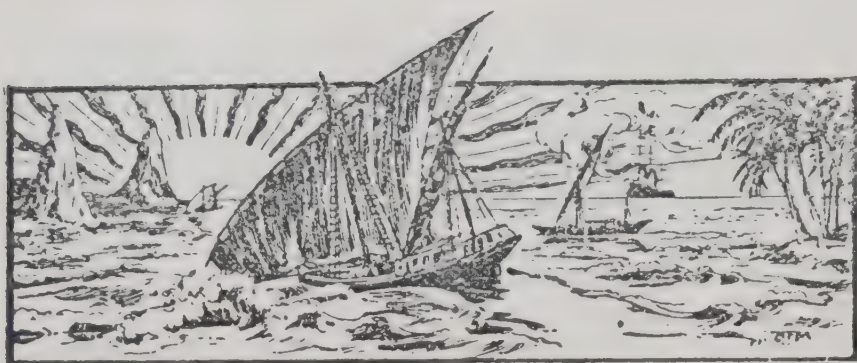
11 first  
3 second  
3 special } prizes.

5. Edward Morris of St. Kitt's, who won three first, and two second, prizes in four classes.

6. St. George's School for collection of plants.

The prizes for cotton have been awarded to growers within a limited area at Gingerland, and it is possible that seed from such cotton may be of value for future planting.





## GLEANINGS.

The *India Rubber Journal* of May 20 states that in Surinam a considerable quantity of Para rubber seed (*Hevea brasiliensis*) has been imported, and appears to be doing well.

A shipment of 130 barrels of tamarinds was made from St. Croix on May 15. This indicates that there is a demand for tamarinds in the New York market. (*St. Croix Avis*.)

There were exported from Jamaica during the official year 1906-7 a total of 10,600,042 cocoa-nuts—an increase of 3,499,088 nuts over the exports of the previous year.

The place chosen for the Rubber Experiment Station in British Guiana is situated at Issoroo. The site possesses three distinct kinds of soils—a low, flat, swampy soil; hill land with an alluvial soil; and hill land with a rocky soil.

A committee has been appointed by the House of Assembly, Barbados, to consider and report upon the cotton industry of that island, and the working of the Sale of Cotton Act.

The Sisal hemp industry of the Bahamas is progressing rapidly, and a large area of land in Nassau is being taken up by capitalists. Increased activity is also noticeable in the neighbouring islands. (*Jamaica Daily Telegraph*, May 17.)

Up to April last, 62,221 lb. of cotton lint were shipped from Nevis, but it is probable that the output of cotton for this year, owing to the very unsatisfactory weather conditions, will not exceed an average of 40 lb. of lint per acre.

An expedition, consisting of Dr. Allan Kinghorn and Mr. R. E. Montgomery, is being sent out to Central Africa by the Colonial Office and the Liverpool School of Tropical Medicine, to carry out investigations into sleeping-sickness.

Several trees were planted at the Roman Catholic School at Laventille, Trinidad, on Empire Day. The day was celebrated as Arbor Day. The trees included *Cassia grandis*, *Peltophorum Linnaei*, and *Pithecolobium* sp. (*Trinidad Mirror*, May 26.)

The draft of the Charter for the incorporation and government of the Imperial College of Science and Technology, to be established at South Kensington, has now been laid on the table of the House of Commons. The purpose of the Imperial College will be to give the highest specialized instruction, and to provide the fullest equipment for the most advanced training and research in various branches of science, especially in its application to industry. (*Nature*, May 16.)

Ground cocoa-nut, freed from sugar by fermentation with yeast, and baked into a cake, is a useful addition to the diet of diabetics. It may be sweetened, if desired, with saccharin. (*Pharmaceutical Journal*, May 18.)

Bourbon vanilla (from Réunion), as it is called, maintains its high character, and although the palmy days of vanilla planting are over, yet, fair profits may yet be made. The price of best vanilla rose from 7s. in January 1906, to 11s. per lb. in December. (*British Consular Reports*.)

The Colonial Premiers during their recent visit to England were entertained by the British Empire League and the British Science Guild, whereby an opportunity was afforded them of meeting men of science and others interested in introducing the scientific spirit into the administration of Imperial affairs. (*Nature*, May 9.)

A recommendation was made by a departmental committee appointed by the Board of Agriculture and Fisheries, England, in 1901, that boron preservatives may be added to cream in quantities not exceeding 0.25 per cent., and to butter to the extent of not over 0.5 per cent., but we are not aware that it has yet been made a legal standard. (*Pharmaceutical Journal*, May 18.)

There has been some extension in rice growing in Porto Rico upon the higher lands during the last year. Practically no irrigated rice is produced, most of the low ground being devoted to sugar-cane. However, the largest importation of foodstuff in Porto Rico still consists of rice, which comes from the port of New Orleans. (*Report of Porto Rico Experiment Station for 1906*.)

Specimens of rubber from the climbing plant, *Cryptostegia grandiflora*, from the Bombay presidency have been examined at the Imperial Institute. The rubber was valued at 3s. 6d. per lb., and the opinion expressed that the carefully prepared product would sell readily at remunerative prices. Samples of rubber of this rubber vine from the Bahamas were submitted to an expert in New York in 1906, and valued at 4s. per lb.

At an exhibition organized by the British Cotton-growing Association, and held in the Commercial Intelligence Department of the Board of Trade, London, Mr. Lloyd-George, M.P. (President of the Board of Trade), referring to West Indian Cotton said: 'The West India Islands and not the United States, he believed, were the original home of the cotton plant, and the very beautiful specimens grown in the former showed that it was the better for returning to its own home.'

Referring to the prospects of the cotton crop in Barbados during the season 1907-8, the *Agricultural Reporter* of May 11 states: 'Preparations are being made generally for planting the July cotton, and we are of opinion that the area will not be diminished from last year's figure. If some who have failed to get a good return during the present season, are discouraged and purpose putting in food crops this year instead of cotton, there are others who are attracted by the report of high prices, and have resolved to make their first trial at the new industry. We would recommend these last to arm themselves with one of the Department's publications on Cotton growing—the 'A.B.C.' is, perhaps, the most handy—and to consult some one who has already made a successful trial of this cultivation.





## POULTRY NOTES.

### Rearing Guinea Fowls.

The following article on the rearing of guinea fowls has been extracted from *Farm Life* of May 11:—

Large coops, with movable runs, should be used for guinea fowl chicks, the coop floors being well bedded with peat-moss or other suitable litter, and the young birds confined to the runs until the sun has evaporated the dew from the grass. In selecting the site for the coops, remember that these birds do better at first in a sunny spot, well sheltered from the wind, and that the turf upon which the coops are placed must be in a dry and well-drained position. The site chosen should be as easily accessible as possible, in view of the fact that these chicks require feeding at frequent intervals during the early rearing period, and need rather special attention and protection until they are between two and three months old.

They should be fed about once every three hours during the first fortnight, or, if it can be managed, it is better to give a smaller quantity every two hours for the first week, gradually lengthening the intervals, and increasing the quantity of food given at each meal, until the number of meals has been reduced to three, and again to two at maturity. The food may consist of ground oats, middlings, biscuit-meal, and meat-meal or granulated meat. Any crumbly mixture of soft food found successful for ordinary chickens may be used, provided—and it is an important proviso in regard to the nature of the birds—that some form of lean meat is used as a regular ingredient.

### The Value of Poultry Manure.

The *Journal of the Board of Agriculture* for March contains an account of last year's experiments on the value of poultry manure carried on at the College poultry farm, Theale, with analyses of samples of manure.

With fowls in confinement and fed on the diet which is commonly given them by English poultry keepers, it was found that about twenty-five fowls, weighing from 5 to 6 lb. each, would give 1 ton of moist manure in one year. Thus a farmer who kept a flock of 100 hens and six male birds would obtain from them, in the course of twelve months, about 4 tons of fresh manure. This manure is valued, on the basis of its contents of nitrogen, phosphoric acid, and potash, at about £1 per ton. When dried in the air, this manure loses nearly two-thirds of its weight, and can then be sold at from £2 10s. to £3 per ton. In the case of a laying fowl, the manure would be worth about 1s. 1d. a year. If forty fowls are kept on an acre of cultivated land, they will keep the crops free from insects, and the manure produced will more than pay the rent of the land.

Fowl manure should not be left in a heap in the rain. It is improved by mixing with superphosphate at the rate of 1 part of the latter to 5 or 6 parts of the fresh manure.

## VANILLA CULTIVATION IN EAST AFRICA.

The following note, extracted from an exhaustive report in the *Tropenpflanzer*, appeared in the *U.S. Monthly Consular Reports* for March last, and gives a summary as to the cultivation and preparation of vanilla in German East Africa:—

The best variety of vanilla comes from *Vanilla planifolia*, which requires a mucky, porous soil. The plant thrives up to a height of about 1,600 feet above sea-level, and as its fleshy roots do not penetrate deep into the soil, it requires only a proportionately thin layer of soil. The plant bears merchantable fruit in the third year, sometimes even in the second year, which require from seven to eight months to mature, and the harvest takes place from April to June. Five to seven harvests are made from the same plant before it is exhausted. New plants must not be planted in the same place as the old.

Protection against wind, also shade, is of great importance for the growth of the plant, and therefore the fields must be surrounded by trees and hedges. Grubs and snails are enemies of the vanilla plant; the former eat the roots, the latter the young sprouts and beans. While in the third year, only about one-tenth part of the plant blossoms, the percentage increasing from year to year up to the seventh.

The cultivation of vanilla in German East Africa is impeded by the absence of insects which are instrumental in fructifying the vanilla blossoms. Each separate flower has therefore to be fructified by human hands, the cover of the stigma being raised by means of a little thin rod, and the pollen, which is just above the cover, is pressed against the stigma.

When the young beans have grown to the length of a finger, they must be closely inspected and all defective ones must be cut off. The beans mature from seven to eight months after the fructification process. The ripe beans have a yellowish-green colour.

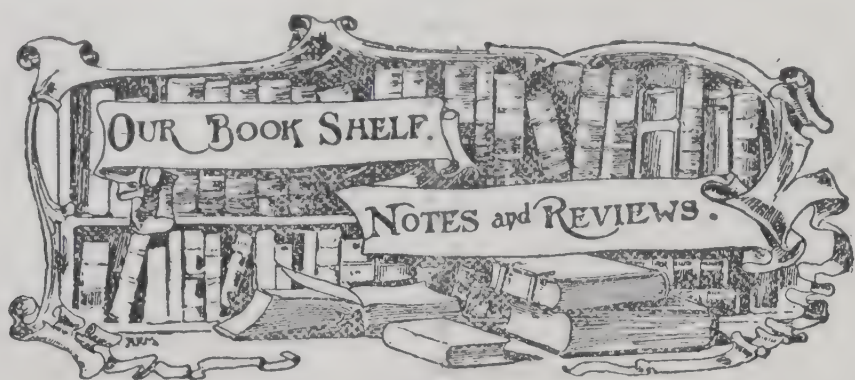
The way of preparing the beans varies, but an ever-increasing temperature is required to dry them and obtain the well-known brown-black colour. In this way the thin-skinned bean with its fine aroma is produced. If hot water is used for heating the beans, they are placed in baskets and immersed in it. The water has a temperature of 100° to 105° C. Afterwards the beans are packed into wooden boxes, which are lined with woollen cloth and closed. The next day they must have a glassy appearance. They are then again wrapped in dark wollen covers and laid in the sun to dry. If the weather is rainy, they must be dried in a dry room at a temperature of 62° C., but an after drying in an airy room of from two to four weeks is necessary. After that the dry beans are packed in tin boxes, where they, however, require close inspection, and have to be repacked every week in order to remove diseased beans or any that have become mouldy.

The value of the beans is measured by their length, which is from 12 to 25 centimetres. For shipment they are sorted, bound in bundles, and put into tight, but not soldered tin boxes, which are now lined with paper instead of tinfoil, as formerly. Black mould is especially dangerous to the beans, while white mould is rather harmless.

## DEPARTMENT NEWS.

Mr. Walter Biffen, B.Sc., arrived from England on June 3, and assumed his duties as Scientific Assistant on the staff of the Imperial Department of Agriculture, in succession to Mr. W. R. Buttenshaw, M.A., B.Sc.





**THEOBROMA CACAO OR COCOA:** Its Botany, Cultivation, Chemistry, and Diseases. By Herbert Wright, A.R.C.S., F.L.S., Messrs. Ferguson, Colombo, Ceylon. Price 7s.

The above is the title of a comprehensive volume on the cacao industry, a volume that deals with every phase of the subject, from a scientific as well as from a practical standpoint.

The book contains much valuable information for the cacao planter, and he would do well to acquaint himself with the facts and figures collected by Mr. Wright from all parts of the cacao-growing world; for the principles of manuring, budding, grafting, pruning, seed selection, and plant sanitation operations in relation to cacao, are neither fully understood nor universally practised, and therefore the information given should be of interest to all planters who are desirous of improving their cacao cultivations.

There are chapters on the history of cacao, the climatic conditions which obtain in the various countries in which the tree is grown, the botanical characteristics of cacao plants, the chemistry of the cacao tree and its products; also on seed selection, the physical and chemical characters of the soils most likely to suit the crop, while the general details of cultivation are dealt with at length, especial attention being given to the question of growing other crops in conjunction with cacao, and the use of shade trees. In connexion with this last question the relative advantages of shading with leguminous trees such as *Erythrina*, or with trees producing rubber are discussed in detail.

Probably one of the most valuable chapters is that which deals with the manuring of cacao—and after considering the value of green manuring, and such natural aids to fertilization as those given by the prunings from the cacao plant, the leaves of the tree itself, and of the shade trees—the author comes to the question of artificial manures, and in this connexion considerable space is given to the results of experiments carried out by the Imperial Department of Agriculture in the islands of St. Lucia and Dominica. The portion of the book dealing with insect pests and fungoid diseases of the cacao tree is full and up to date, while the final chapter gives information respecting the exports, imports, and uses of cacao.

**SCHLICH'S MANUAL OF FORESTRY, VOL. IV, FOREST PROTECTION.** (Second Edition.) By W. R. Fisher, M.A. London: Bradbury, Agnew & Co. Price 12s.

This book, of over 700 pages and provided with 300 illustrations, which appears as the fourth volume of Dr. Schlich's well-known *Manual of Forestry*, was adapted from the best German work on the subject, viz., *Der Forstschutz*, by Dr. R. Hess; and Mr. Fisher, who was at one time Conservator of Forests to the Government of India, has been able to add many matters of importance to tropical foresters.

The book appears to be the only comprehensive treatise on this subject in the English language, and as the protection of forests is assuming considerable importance in several of

the West India Islands, it may be studied with advantage here. The most important of its contents are: (1) forest boundaries, (2) utilization of forest produce, (3) protection of forests against offences, (4) protection against injurious mammals (especially goats), and birds, (5) injurious forest insects, (6) protection against weeds (including parasites and epiphytes) and fungi, (7) protection against drought, (8) against violent winds and floods, and (9) rules for protection against fire and for fighting forest fires.

This volume, dealing with forest protection, is uniform with Vols. I, II, and III, previously issued, and forms a valuable addition to the library of any one interested in, or connected with, forestry.

## AGRICULTURE IN THE LEEWARD ISLANDS.

The following paragraph has been taken from the despatch of his Excellency Sir Bickham Sweet-Escott, K.C.M.G., printed in the *Antigua Standard* for April 27, submitting the estimates for the year 1907-8 for consideration of the Right Honourable the Secretary of State for the Colonies:—

The estimates for this Department under all subheads have been submitted to, and approved by, the Imperial Commissioner of Agriculture for the West Indies, whose cordial co-operation in this as in all other matters I recognize gratefully. In Sir D. Morris' opinion, as in mine and in that of the Executive Council, the time has come for the Government to divest itself of the charge of, and responsibility for, the Cotton Factory, which, under the able direction of Dr. Watts, the Superintendent of Agriculture, has done such excellent work, and has insured for cotton growers the means not only of having their cotton ginned but also of having it sold. The cotton industry in Antigua is now sufficiently established to be able to stand by itself, and a strong and representative local Association has been formed which has taken over the business as a going concern from the Government. Two gins have since been added to the factory, and the Association have entered on an enterprise which promises to be a complete success. I take the opportunity here of expressing the view, which I have been careful to make known in Antigua, St. Kitt's, Nevis, Montserrat, and Anguilla, that 'The Cotton Industry Aid Act, 1906,' notification of non-disallowance of which was conveyed by Your Lordship's despatch No. 145 of July 18 last, should not be renewed this year, and that, if cotton growers require advances to meet their current expenditure until crops are sold, they must look elsewhere than to the Government for temporary assistance. Provision has been retained for the upkeep of the Stud Farm, but the question of its continuance on the present lines is under consideration. In the opinion of Sir D. Morris, myself, and others, there is no justification now for keeping up the farm at an annual loss to the Government, and unless persons are prepared to pay reasonable fees for the use of the stud animals, other arrangements must be made.

## CITRATE OF LIME IN DOMINICA.

An Ordinance has just been passed in Dominica that imposes an export duty of 1s. 3d. per cwt. on citrate of lime manufactured in that island, while all chalk or lime imported for use in the manufacture of that article will be admitted free of duty, provided that a certificate be given the Treasurer specifying that such chalk or lime is imported for that purpose.



## COTTON MEETING AT ANTIGUA.

A special meeting of the Antigua Agricultural and Commercial Society was held on Friday, April 19, in order to discuss the question of the prevention of cotton diseases. At this meeting, Dr. Watts gave an account of the pests and diseases which attack cotton, and Mr. A. H. Kirby read a paper summarizing the results of experiments which had been performed in connexion with the disinfection of cotton seed.

Dr. Watts divided his subject into four parts. Of these, the first dealt with the insect pests of cotton, the second with the fungoid and bacterial pests, the third with those physiological conditions which prevent the bolls from coming to maturity or cause them to be shed before they are ripe, and the fourth with general remedies for disease. The insect pests treated of were as follows:—

(1) Caterpillars of the cotton worm, boll worm, and cut worm: Dusting with Paris green and lime was the remedy for the first, and, when it is young, for the second; it must be applied as early as possible, and a stock of it should always be kept ready. For the boll worm, planting corn between the rows, and burning it when the eggs had been deposited on the silks, had been suggested in the United States, but more knowledge of the egg-laying times of the moth under local conditions was required before this remedy could be applied with certainty of success. Paris green, mixed with bran and molasses, was a good remedy for cut worm, and much may be done in all cases by trapping moths.

(2) The cotton stainer: This was best dealt with by shaking the insect from the plants into cans containing kerosene and water, and by placing heaps of cotton seed throughout the fields, and subsequently soaking them with kerosene and burning them.

(3) The red maggot: This was not a pest in Antigua, but sometimes did serious damage in Barbados.

(4) Cotton aphis, which was easily got rid of by spraying with kerosene emulsion, and which was kept down by 'lady birds'; lady birds, therefore, should not be destroyed, but encouraged.

(5) Scale Insects: The chief of these was *Lecanium nigrum*, and to prevent it from spreading, all old cotton plants should be destroyed.

(6) The leaf-blister mite: Reference was made to the work which had been done in England in regard to this pest on blackberry bushes. There, as here, it had been found almost impossible to rid plants of this pest, once it had become well established. The remedies here were therefore: (1) careful inspection and removal, in drill bags, of all infected parts, with immediate destruction by plunging the bags into boiling water; (2) the burning of all old plants.

Of the fungoid and bacterial pests; rust, mildew, round spot and angular spot were not serious; if remedies for them were desired, the application of Bordeaux mixture or dusting with lime and sulphur was effective. Pink spot (anthracnose) and black boll were more serious, as they attacked the bolls and rendered them valueless. There was no remedy for them when once established. Recourse should be had, as in the case of the other blights, to prevention by the careful disinfection of all cotton seed, the destruction of old plants, and the selection of disease-resistant varieties.

Boll shedding, and the non-maturing of bolls, were the results of some physiological condition in the plant which was probably induced by severe and sudden changes in the surrounding conditions, due to the weather or to irregular and

spasmodic weeding. In selecting plants for seed, notice should be given to the presence or absence of those diseases.

The general remedies in regard to cotton diseases were as follows: (1) the careful disinfection of all cotton seed, either foreign or home-grown, (2) the destruction of old cotton plants.

Mr. Kirby's paper dealt with experiments which had been devised with the view to finding the effect of treating cotton seed with solutions of corrosive sublimate, formalin, and alcohol (1) on the growth of moulds during germination, (2) on the seed itself. The strengths used were, respectively, 1 part of corrosive sublimate in 1,000 parts of water (equal 1 oz. in 7 gallons, approximately), 1 part of formalin in 500 parts of water and, in the case of the alcoholic mixture, equal parts of alcohol and water.

## MEETING OF COTTON PLANTERS AT MONTSERRAT.

A special meeting of cotton planters of Montserrat was held on April 29 at the Court House to consider the advisability of compulsory destruction of all old cotton, with a view to the prevention of the spread of insect pests, etc., and thereby safeguard the industry. The meeting was largely attended and was fully representative of the cotton industry of the island. The following resolution was proposed and adopted:—

'In view of the desirability of having all old cotton plants destroyed by a certain date in each year for the purpose of preventing the spread of *Phytoptus* [leaf blister-mite] and other diseases; resolved that the Government be urged to introduce an Ordinance making such destruction compulsory, and that in such Ordinance there should be a clause stating that the date of destruction shall be decided at a public meeting of cotton growers to be held in the month of March in each year.

## PRESERVATION OF KOLA SEEDS.

The *Pharmaceutical Journal* of April 27 has the following brief article on the preservation of fresh kola seeds:—

The therapeutical value of fresh kola seeds is well known to be far superior to that of the dried seeds. The difficulty of procuring the fresh seeds, and the facility with which their active constituents are changed by an oxydase contained in the seeds have, up to the present, stood in the way of their employment. Bourquelot has proposed to extract the fresh seeds by boiling them with 95 per cent. alcohol, by which the oxydase (koloxydase) is destroyed, and a tincture free from it obtained. It does not, however, permit of the preparation of a powdered kola suitable for use in pharmacy. The method now proposed of effecting this is by sterilising the seeds as follows: The fresh seeds, entire or separated into their cotyledons, are spread in thin layers on wire baskets; these are introduced into an autoclave previously heated to 100°; the temperature is then raised to 105-110° for five to ten minutes; the seeds are then taken out, cut into small pieces and dried either by exposure to the air or in a drying cupboard. White seeds remain white with the exception of a slight pink tinge on the surface, but red seeds turn violet. It is essential that the temperature of the seeds be rapidly raised from 15° to 100°. The powder thus obtained gave an excellent yield of kolatin, and may be employed for the preparation of tablets, cachets, etc.



## MARKET REPORTS.

**London**,—May 21, 1907. 'THE WEST INDIA COMMITTEE CIRCULAR,' Messrs. KEARTON, PIPER & Co.; Messrs. E. A. DE PASS & Co., May 17, 1907; 'THE LIVERPOOL COTTON ASSOCIATION WEEKLY CIRCULAR,' May 3, 1907.

ARROWROOT—St. Vincent,  $2\frac{1}{4}d.$  to  $2\frac{3}{4}d.$  per lb.  
BALATA—Sheet, 2/6 to 2/7; block, 1/10 to 1/10 $\frac{1}{2}$  per lb.  
BEES'-WAX—£8 to £8 7s. 6d per cwt.  
CACAO—Trinidad, 90/- to 98/- per cwt.; Grenada, 83/- to 86/6 per cwt.  
CHILLIES—Dark Mombasa, 16/- to 16/6; fair, 17/- per cwt.  
COFFEE—Jamaica, low to ordinary, 35/- to 37/-; good to fine ordinary, 38/6 to 46/-; low middling, 48/ to 6 1/-; pea berry, 50/- to 63/-; Santos, 27/- per cwt.  
COPRA—£23 10s. to £24 c.i.f., per ton.  
COTTON—St. Kitts,  $22\frac{1}{2}d.$ ; St. Croix,  $20d.$  to  $22\frac{1}{2}d.$ ; Montserrat,  $14d.$  to  $22\frac{1}{2}d.$ ; Antigua,  $22d.$  to  $26d.$ ; Barbados,  $22\frac{1}{2}d.$ ; St. Vincent stained,  $8d.$  to  $12d.$  per lb.  
FRUIT—  
BANANAS—Jamaica, 5/6 to 7/6 per bunch.  
PINE-APPLES—St. Michael's, 1/6 to 4/- each.  
GRAPE FRUIT, 22/- to 27/- per box.  
ORANGES—8/6 to 11/- per box.  
FUSTIC—£4 5s. to £4 15s. per ton.  
GINGER—Jamaica, good medium to bold, 90/- to 96/-; low middling, 84/- to 90/-; ordinary to good ordinary, 75/- to 82/-; ratoon, 70/- per cwt.  
HONEY—Dark to fair bright, 18/- to 25/6; greyish to white set, 20/- to 26/-; fine pale, 27/- to 28/- per cwt.  
ISINGLASS—West Indian lump, 1/8 to 1/11 per lb.  
LIME JUICE—Raw, 1/4 to 1/6 per gallon; concentrated, £25 per cask of 108 gallons; Distilled Oil, 3/1 per lb.; hand pressed, 3/6 to 3/9 per lb.  
LOGWOOD—£4 5s. to £4 15s.; roots, £3 5s. to £4 5s. per ton.  
MACE—West Indian red, 1/5 per lb.  
NUTMEGS—78's,  $9\frac{1}{2}d.$ ; 95's to 99's,  $6\frac{1}{2}d.$ ; 132's,  $5\frac{1}{2}d.$  per lb.  
PIMENTO—Fair,  $2\frac{3}{4}d.$  per lb.  
RUM—Jamaica, 2/8 to 2/11; Demerara, 1/0 $\frac{1}{2}$  to 1/1 $\frac{1}{2}$  per proof gallon.  
SUGAR—Crystals, 16/- to 18/3; Muscovado, Barbados, 15/3 to 15/9 (in barrels); Molasses, 12/6 to 15/6 per cwt.

**Montreal**,—April 23, 1907.—Mr. J. RUSSELL MURRAY.  
(In bond quotations, c. & f.)

COCOA-NUTS—Jamaica, \$29.00; Trinidad, \$27.00 per M.  
COFFEE—Jamaica, medium, 10c. to 12c. per lb.  
GINGER—Jamaica, unbleached, 16c. to 18c. per lb.  
MOLASSES—Barbados, 25 $\frac{1}{2}$ c.; Antigua, 20c. per Imperial gallon.  
NUTMEGS—Grenada, 110's, 17c. per lb.  
PIMENTO—Jamaica,  $5\frac{3}{4}c.$  to 6c. per lb.  
SUGAR—Grey crystals, 96°, \$2.50 per 100 lb.  
—Muscovados, 89°, \$2.03 per 100 lb.  
—Barbados 89°, \$2.60 to \$2.70 per 100 lb.

**New York**,—May 17, 1907.—Messrs. GILLESPIE BROS. & Co.

CACAO—Caracas,  $18\frac{1}{2}c.$  to  $19\frac{1}{2}c.$ ; Grenada,  $17\frac{1}{2}c.$  to 18c.; Trinidad,  $18\frac{3}{4}c.$  to  $19\frac{1}{4}c.$ ; Jamaica,  $16\frac{1}{4}c.$  to  $17\frac{1}{2}c.$ ; Dominica, 16c. to  $16\frac{1}{2}c.$  per lb.  
COCOA-NUTS—Jamaica, \$26.00 to \$27.00; Trinidad, \$24.00 to \$25.00 per M.  
COFFEE—Jamaica ordinary,  $7\frac{1}{2}c.$  to 8c.; good ordinary,  $8\frac{1}{4}c.$  to  $8\frac{1}{2}c.$ ; Rio No. 7,  $6\frac{3}{4}c.$  per lb.  
GINGER—Small to bold dark root,  $14\frac{3}{4}c.$  to  $15\frac{1}{4}c.$ ; small to bold bright,  $15\frac{1}{2}c.$  to 16c. per lb.  
GOAT SKINS—Jamaica, 58c.; Antigua, and Barbados, 57c.; St. Kitt's, St. Thomas, and St. Croix, 50c. to 51c. per lb.  
GRAPE FRUIT—Jamaicas, \$6.00 to \$8.00 per barrel; \$3.00 to \$4.00 per box.  
LIMES—\$7.00 to \$8.50 per barrel.  
MACE—27c. to 39c. per lb.  
NUTMEGS—95's to 100's,  $16\frac{1}{2}c.$ ; 100's to 110's, 12c.; 130's

to 140's, 11c.; broken and shrivels, 7c. to 7 $\frac{1}{2}c.$  per lb.  
ORANGES—Jamaica, \$2.50 to \$3.00 per box; \$5.00 to \$6.00 per barrel.  
PIMENTO— $5\frac{1}{4}c.$  per lb.  
SUGAR—Centrifugals, 96°, 3.875c. to 3.92c.; Muscovados, 89°, 3.375c. to 3.42c.; Molasses, 89°, 3.125c. to 3.19c. per lb., duty paid.

## INTER-COLONIAL MARKETS.

**Barbados**,—June 1, 1907.—Messrs. T. S. GARRAWAY & Co., and Messrs. JAMES A. LYNCH & Co., June 3.

ARROWROOT—St. Vincent, \$4.25 to \$4.75 per 100 lb.  
CACAO—Dominica, \$18.00 per 100 lb.  
COCOA-NUTS—\$14.00 per M. for husked nuts.  
COFFEE—\$10.00 to \$10.50 per 100 lb.  
HAY—\$1.30 to \$1.40 per 100 lb.  
MANURES—Nitrate of soda, \$62.60; Ohlendorff's dissolved guano, \$55.00; Cotton manure, \$42.00; Cacao manure, \$42.00 and \$48.00; Sulphate of ammonia, \$72.00 to \$75.00; Sulphate of potash, \$67.00 per ton.  
MOLASSES—16c. per gallon.  
ONIONS—Antigua, strings, \$2.00 to \$2.50; loose, \$2.00 per 100 lb.  
POTATOS, ENGLISH—\$3.00 to \$3.25; Canadian, \$2.40 to \$2.75 per 160 lb.  
PEAS Split, \$5.75 to \$6.00; Canada, \$3.10 per bag.  
RICE—Demerara, \$5.65 to \$5.80; Ballam, \$6.00 to \$6.50 per bag (190 lb.); Patna, \$3.75 to \$3.90; Rangoon, \$3.00 per 100 lb.  
SUGAR—Dark crystals, \$2.30; Muscovado, \$1.85 per 100 lb.  
SYRUP—17 $\frac{1}{2}c.$  per gallon.

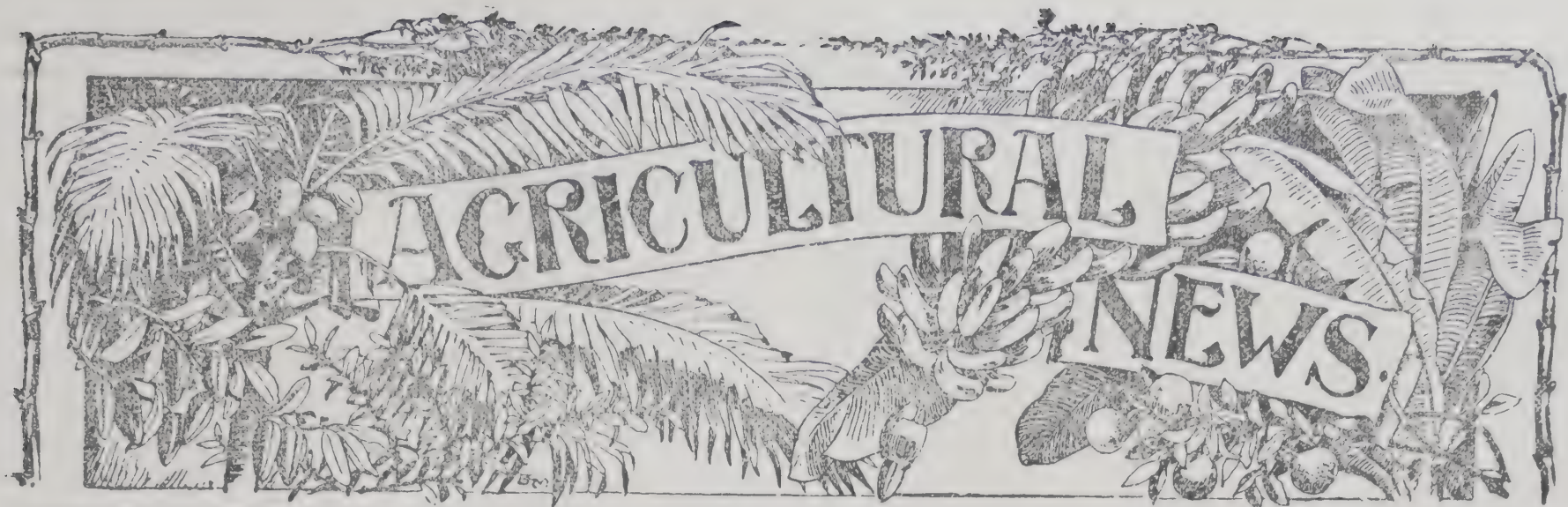
**British Guiana**,—June 8, 1907.—Messrs. WIETING & RICHTER.

ARROWROOT—St. Vincent, \$10.00 per barrel.  
BALATA—Venezuela block, 32c.; Demerara sheet, 48c. per lb.  
CACAO—Native, 17c. to 18c. per lb.  
CASSAVA—No stock.  
CASSAVA STARCH—\$8.00 per barrel.  
COCOA-NUTS—\$12.00 to \$16.00 per M.  
COFFEE—Creole, 14c. to 15c.; Jamaica, 13 $\frac{1}{2}c.$  per lb.  
DHAI—\$5.25 to \$5.50 per bag of 168 lb.  
EDDOS—\$1.20 to \$1.44 per barrel.  
MOLASSES—16c. per gallon.  
ONIONS—Lisbon, 6c. to 8c.; garlic, 8c. per lb.  
PLANTAINS—12c. to 32c. per bunch.  
POTATOS, ENGLISH—\$3.75 to \$4.00; Nova Scotia, \$3.25 to \$3.50 per barrel.  
POTATOS, SWEET—Barbados, \$1.56; Creole, \$1.20 per bag.  
RICE—Ballam, \$6.25 to \$6.50 per 177 lb.; Creole, \$5.25 to \$5.50 per bag (ex store); Seeta, \$5.50 to \$6.00; per bag.  
SPLIT PEAS—\$5.90 per bag (210 lb.).  
TANNIAS—\$2.16 per bag.  
YAMS—White, \$3.00; Buck, \$4.00 per bag.  
SUGAR—Dark crystals, \$2.50 to \$2.55; Yellow, \$2.90 to \$3.10; White, \$3.60 to \$4.00; Molasses, \$2.00 to \$2.20 per 100 lb. (retail).  
TIMBER—Greenheart, 32c. to 55c. per cubic foot.  
WALLABA SHINGLES—\$3.50 to \$5.50 per M.

**Trinidad**,—May 11, 1907.—Messrs. GORDON, GRANT & Co.

CACAO—Ordinary to good red, \$18.75 to \$19.00; estates, \$19.25 per fanega (110 lb.); Venezuelan, \$18.75 to \$19.25.  
COCOA-NUTS—\$21.00 per M., f.o.b.  
COCOA-NUT OIL—90c. per Imperial gallon (cask included).  
COFFEE—Venezuelan, 8c. to  $8\frac{1}{2}c.$  per lb.  
COPRA—\$4.00 to \$4.15 per 100 lb.  
DHAI—\$4.40 to \$4.60 per 2-bushel bag.  
ONIONS—\$3.00 to \$4.25 per 100 lb. (retail).  
POTATOS, ENGLISH—\$1.50 to \$2.50 per 100 lb.  
RICE—Yellow, \$5.50 to \$5.65; White, \$5.75 to \$6.00 per bag.  
SPLIT PEAS—\$5.40 to \$5.50 per bag.  
SUGAR—Crystals, \$2.00 to \$2.50 per 100 lb.





## A FORTNIGHTLY REVIEW OF THE IMPERIAL DEPARTMENT OF AGRICULTURE FOR THE WEST INDIES.

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### Cultivation of Sea Island Cotton:

**T**HE cotton industry has become, within a few years, of such value to some of the West India Islands, that it is of importance that those engaged in it should continue to devote the closest attention to all details of cultivation and treatment, so as to maintain fully the present high character of West Indian Sea Island cotton. It has been thought that the present would be a convenient

opportunity to bring forward some of the points which should receive careful consideration at the hands of planters during the coming season.

In districts new to cotton growing, the labour question should be carefully considered before any decision is arrived at, for, at certain periods during the cultivation and gathering of cotton, an abundance of labour, especially of women and children, is essential.

Having satisfied himself as to the supply of labour, the planter should next devote attention to the choice of land. In the West India Islands, cotton has been grown on practically every type of soil from heavy clay to almost pure sand, but it is becoming more fully recognized that the best results are obtained from fairly light loams, capable of being easily worked. The land chosen should be in a district possessing a suitable and evenly distributed rainfall, preferably not more than 70 to 80 inches per annum, and it should be naturally sheltered from strong winds.

The next point to be considered is the acreage that should be planted, and in this respect it is desirable to bear in mind, as the crop season is a short one, that every detail should be carefully and thoroughly carried out at the right time. Thus it follows that the supply of labour, and also the amount of attention and supervision capable of being given to the crop should be well borne in mind. It has been shown, over and over again, that a small acreage with suitable supervision and a sufficient labour supply will always give satisfactory results.

As regards cultivation, the land should be carefully ploughed or forked, and the surface soil well pulverized, some time before the seed is planted. If pen or sheep



manure is to be applied, about one-half the quantity usually given to canes should be put into the land; the earlier the manure is applied the greater will be the benefit to the cotton. (As to the use of artificial manures, see *A.B.C. of Cotton Planting*, p. 91.) We would repeat that thorough and careful preparation of the land is essential for success. This determines not only the yield, but the general health of the plants and the ultimate quality of the fibre.

The provision of good drainage is another matter that must not be forgotten. Also, in many instances, especially in exposed, wind-swept situations, wind-breaks of pigeon peas or guinea corn should be planted as early as possible.

Only the best seed should be used for planting purposes, for it has been shown that the proper selection of seed is of the utmost importance in maintaining the high quality of Sea Island cotton. Good results cannot be expected if inferior seed is used. Planters, unless they have first-class seed at hand, are strongly recommended to avail themselves of the opportunity of obtaining reliable seed from the officers of the Imperial Department of Agriculture (*Agricultural News*, Vol. VI, pp. 161 and 185).

The cotton seed supplied by the Department this year, has not been disinfected beforehand. This, in order to preserve its germinating power, should be done at the port of arrival or at the plantation, and in the manner described in the last issue of the *Agricultural News*, p. 183. The germinating power of the seed should also be tested. In the case of seed of low germinating power, a larger number of seeds should be planted in each hole in order to obtain a good 'stand.'

The time for planting extends from about the beginning of June to the end of September; seed has been planted in almost every month of the year, but it appears to be generally accepted that, depending on the rains, June to September planting gives the most satisfactory results. The season varies in each locality and, therefore, local experience must influence the planter to a large extent. It would seem, however, that planting after September is not to be generally recommended.

In planting cotton seed, attention should be given to the distances between the rows and between the individual plants in the rows. Where the land is rich, and experience has shown that the plants grow large, the seed should be planted wider than where the soil is poor. The planter himself must decide for every field what distances, in his experience, are likely

to give the best results; but it must not be forgotten that more mistakes have been made by planting too close than from too wide planting.

As soon as the young plants make their appearance, constant watchfulness must be exercised for the first signs of insect pests. The cut-worm must be looked for, and poisoned bait applied when necessary. A sharp watch should also be kept for the first appearance of the cotton worm. This is possibly the most destructive of all cotton pests.

Supplies of Paris green and lime should be obtained before planting the seed, and dusting with the mixture in the proportion of 1 lb. of Paris green to 6 lb. of lime, should commence on the first sign of the cotton caterpillar. It has been proved that no fear need be felt from attacks of the cotton worm if only the mixture of Paris green and lime is promptly applied. The mixture recommended by this Department is 1 part of Paris green to 6 parts of lime by weight; or, if *by measure*, the proportion should be 1 part of Paris green to 12 parts of lime. It is probable that, hitherto, large quantities of Paris green and lime have been wasted through want of care in applying them, or in applying them at the wrong time.

Having briefly reviewed the points of immediate importance for cotton planters, it remains only to refer them to the new Edition of the *A.B.C. of Cotton Planting*, lately issued, obtainable from the Agents of the Department in all parts of the West Indies, and to the cotton notes that have appeared in the last few numbers of the *Agricultural News*. They may also be reminded that a valuable subsidiary industry is now placed within their reach—an industry that will depend for its further development upon the continuance of that careful and constant attention which the most successful planters have devoted to it during the past few years. Those who have not hitherto, been so successful as could be wished, have only to follow the example of their more careful and enterprising neighbours in order to make cotton planting as profitable as any industry within their reach in these Colonies.

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## SUGAR INDUSTRY.

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### The Identity of Seedling Canes in Demerara.

The following paragraph appeared in the *International Sugar Journal*, May 1907, pp. 219-20:—

Some time back suspicion began to be felt that the cane cultivated on the well-known Diamond estate in Demerara under the name of B. 208 was not the original seedling



variety of that designation. This suspicion has now become an ascertained fact; we are also informed that the *Diamond* B. 208 has been identified as the *White Tanna*, but this still requires confirmation.

How the confusion arose we are not aware, but with a system of mutual co-operation such as obtains in Java and Hawaii, such an error would have been detected before any harm resulted.

The results obtained at 'Diamond' with seedling cane cultivation have been published periodically in the West Indian press, and have attracted much attention and interest. But if our information as to the *White Tanna* is correct, these results are of course invalidated, as the *White Tanna* is not a seedling cane, but a bud sport from the *Striped Tanna*. And we fear that if, on the strength of the Diamond estate results, many other estates have tried B. 208 seedlings, much annoyance—not to say indignation—will have been caused.

A somewhat similar statement appeared in the *West India Committee Circular*, May 21, 1907, p. 250:—

*The International Sugar Journal* states that for some time back suspicion has been felt that the cane cultivated on the well-known Diamond estate in Demerara under the name of B. 208 was not the original seedling variety of that designation. This suspicion, our contemporary states, has now become an established fact, and a report, which still, however, requires confirmation, is that the Diamond B. 208 has been identified with the *White Tanna*. The *White Tanna* is not a seedling cane but a bud sport of the *Striped Tanna*. Much extension of the real B. 208 has been made on other estates as the result of the 'Diamond' published results.

Hitherto the only doubt expressed in respect to the seedling cane B. 208 at Diamond estate was contained in the Official Report of the Director of Science and Agriculture at British Guiana on progress in the sugar-cane experiments carried on under his direction at the experimental fields attached to the Botanic Gardens during the period July 1, 1905, to March 31, 1906:—

The very low yield of B. 208, which is in striking contrast to the yields obtained from the variety when cultivated on very large scales on estates on the Demerara river, is due, in my opinion, to one of two causes—either the unsuitability of B. 208 for cultivation on very heavy clay soils, or that the cane sent to us from Barbados as B. 208 is a different variety to the one grown at plantations 'Diamond' and 'Wales' under that designation. In its general character, mode of growth, and relative yield per acre, B. 208 as grown by us resembles, but is inferior to, D. 102, a variety we have discarded.

Although the identity of B. 208 as grown at 'Diamond' (within a few miles of the Botanic Gardens) was a matter capable of being settled either before the above statement was published, or soon after, no steps appear to have been taken in that direction.

In view of what appeared in the *International Sugar Journal*, Mr. John M. Fleming, the Manager of 'Diamond,' addressed a letter, dated May 27, to the Editor of the *Demerara Daily Chronicle*, from which we quote as follows:—

It may be enough for me at present to state, that the cane grown here as B. 208 was originally sent me by Sir Daniel Morris under that description, and that it has all the characteristics of that particular seedling as given year after

year in the sugar-cane reports issued by the Imperial Department of Agriculture. . . .

Cuttings of it have been given by me to various planters in British Guiana, and none of them have ever told me that it differs in any way from the B. 208 canes received by them direct from Barbados or from the local Board of Agriculture. . . .

On December 31, 1906, of 7,075 acres in cane cultivation at Diamond, only 1,584 were in Bourbon, while 2,676 acres—an area since increased—were in B. 208.

Later, samples of seedling cane B. 208 grown at 'Diamond' were forwarded for examination by the Officers of the Imperial Department of Agriculture, with the result that they have been shown to be typical B. 208 and identical in every respect with the original Barbados cane of that variety.

Further, in order to dispose finally of the matter, on the suggestion of the Imperial Commissioner of Agriculture, a Departmental Committee was appointed by the Governor of British Guiana to investigate and report on the identity of Cane B. 208 as grown at Diamond estate. The Committee consisted of Mr. E. W. F. English, B.A., Acting Director of Science and Agriculture; Mr. A. W. Bartlett, B.Sc., F.L.S., Government Botanist; and Mr. Robert Ward, Agricultural Superintendent.

The Report dated June 6, addressed to the Government Secretary, was as follows:—

With reference to your letter No. 3,428 of the 3rd. instant, appointing a Committee to inquire into the identity of the cane grown at Plantation 'Diamond' as B. 208, we have the honour to report that after an examination of the seedling in cultivation at Plantation 'Diamond' under the name of B. 208, we are of opinion that there has been no mistake as to its identity as such.

We desire to record our thanks to Mr. Fleming for the courtesy we have received from him during our visit to the Estate.

In reference to the general estimation in which B. 208 is held, not only in certain parts of British Guiana but elsewhere, the following may be of interest:—

Mr. Fleming in 1904, stated: 'B. 208 is, in my opinion, the best cane you have given us so far. A very strong point in its favour is that in every trial I have made of it, I have invariably found the juice of excellent quality.' (*Agricultural News*, Vol. III, p. 180.)

Dr. Watts in his report on the sugar-cane experiments in the Leeward Islands for 1904-5 places on record that: 'B. 208 heads the list of canes grown as ratoons in these experiments with a yield of 30 tons of cane and 8,508 lb. of sugar in the juice.' (*Agricultural News*, Vol. V, p. 51.)

At Jamaica, Mr. Cousins reports: 'B. 208 has done splendidly in the dry districts of St. James and Trelawney; the variety was the best for Jamaica.' (*Agricultural News*, Vol. IV, p. 83.)

Among the newer varieties of seedling canes that have been raised and carefully tested during the last few years at Barbados there are probably forty that exhibit qualities even more promising than B. 208. While B. 208 may be regarded as an early maturing and good ratooning cane, yielding juice of exceptional purity, and one not liable to disease, it is hoped to recommend still better canes in the near future.





## WEST INDIAN FRUIT.

### BANANAS IN HAWAII.

The following note on a promising variety of banana, which it is hoped will be put on the export market at an early date, is taken from a recent *Report* of the Agricultural Experiment Station at Hawaii:—

A new commercial variety of banana, it is believed, will be found in the form locally known as the Brazilian, which is probably the same as the Pisang Radjah, or the Pisang Medgi of Java. This variety has not been exported because of its habit of falling from the bunch when thoroughly ripe. It is, however, superior to the Cavendish variety in many ways, and we believe it will pay for greater care in handling when its merits come to be known. In point of flavour it far exceeds any banana now in the American market, and is excelled by none grown in the territory. It seems to be much less subject to some of the diseases which mar the appearance of the Chinese banana, and is very much more attractive, being of a clear, yellow colour. A large part of the temporary shade for cacao at the Hilo plantation is composed of this variety of banana, the intention being to make experimental shipments of the fruit later to San Francisco.

### FRUIT IN PORTO RICO.

Many experiments in connexion with the production of fruit are in progress at the Porto Rico Agricultural Experiment Station. They are mainly concerned with testing the adaptability of various introduced fruits, the selection of superior varieties found in the island, and with methods of propagation, planting, manuring, etc. The following extracts are taken from the recently published *Annual Report* of the station:—

All the varieties of pine-apple under experiment have fruited this year, producing a number of interesting types, all of which will have to be tried further before specific recommendations can be made. The Ruby, a variety from Jamaica, is the most promising of all the less-known kinds tried. The Variegated Lajas, a variety found by the Horticulturist to the station, in a field near Lajas, has produced fruit this year. This is a strikingly handsome plant, the leaves being variegated, and of a much brighter hue than the Variegated Cayenne. The variegation is, however, not in the plant alone, but also in the fruit, making it very valuable for decorative purposes, while the quality is equal to that of the ordinary Cabezona. While this is the only new variety given a name, there are a number of others under observation. Pine-apples in Porto Rico are not readily

classified because of the great local variation. We have as yet only four named varieties, but there are many distinct types which are now being collected for the purpose of naming, if they should prove to be stable. The Pan de Azucar, sent from here to Dominica, is described as being the same as Black Antigua, but plants received here from Antigua under that name are quite distinct from our Pan de Azucar.

More mango trees have been planted in the orchard, and also about 15 acres in another part of the station grounds. More inarched plants have been received from the United States Department of Agriculture at Washington, and those received last year are in good condition, although they have made but slow growth. Large trees budded and inarched last year are making very rapid growth and will soon yield considerable bud-wood. While it has been impossible to devote much time to propagation, all the different methods described by writers on this subject have been tried, and there is no question about the feasibility of propagating the mango here. It may be stated that some varieties are much more subject to mango blight than others, which fact should be considered when selecting seeds for a nursery, because trees, on which the young shoots and the leaves in all stages are continually killed back, make but slow growth and are extremely difficult to bud. This same factor should also be considered in selecting bud-wood from improved varieties, for although the disease can be kept in check by spraying, it needs no argument to convince a Porto Rican planter that spraying is very costly, and often too costly an operation here.

### TOBACCO CULTIVATION IN VICTORIA.

The following note on the progress of the tobacco industry in Victoria is extracted from the United States *Consular Reports* for May:—

The tobacco grown last year in Victoria has commanded a ready market among local manufacturers at higher prices than have been obtained during the previous five years. On the Government experimental farm, 2,000 lb. dry weight of cigar tobacco were grown. Comstock, Zimmor, Spanish, Connecticut seed-leaf, and Connecticut broad-leaf varieties all gave good results, the Comstock proving to be the most suitable. The crop of pipe tobacco gathered yielded approximately 1,500 lb. Seeds of different tobaccos imported have been distributed for cultivation. The experiments of the Department are to be carried out on a more extended scale, and every effort is being made by the Government to establish the industry in this State.



## AGRICULTURAL POSSIBILITIES IN WEST AFRICA.

According to the Right Honourable Viscount Mountmorres, the lands bordering on the West Coast of Africa possess rich agricultural resources that are only awaiting development. Below is given an extract from an address on 'The Commercial Possibilities of West Africa,' delivered in London by Lord Mountmorres a short time ago, and reprinted in the *Journal of the Royal Colonial Institute* :—

The line upon which the development of British West Africa should proceed, so far as agriculture is concerned, is the encouragement and education of native planters. The native, just as he has been introduced on the Gold Coast to cacao cultivation, can be taught and induced to grow an enormous number of other forms of tropical produce for which the country is suited, but which at present are not raised in it. The white man must content himself with making his profit by trading in this produce. The list of forms of cultivation which might be established in West Africa, with almost a certainty of success, is as long as that in any other tropical country, with the possible exceptions of Java and Ceylon; and in many cases West Africa will produce crops in a higher state of excellence, or more easily, than they can be raised elsewhere in the tropics. Lagos maize is a case in point. There is no reason why Southern Nigeria should not at a very early date be one of the great maize-producing countries of the world. It is capable of producing a maize of a quality superior to almost any other, and of producing it in vast quantities. And it must always be borne in mind that, in the development of a new country, a staple product, such as maize, is of far greater economic advantage than even high-priced commodities, such as cacao and rubber, of variable and comparatively restricted demand. Again, almost all over the British colonies, ground nuts could be raised. The French colony of Senegal exports £600,000 worth of ground nuts annually, principally for the manufacture of olive oil. The Gambia is the only British colony which exports any ground nuts to speak of, and a great part of this export is derived from the French colonies on its border. The possibilities of Northern Nigeria as a cotton-producing country are already being proved by the British Cotton-growing Association, with every prospect of enormous success. There are very many other fibre-producing plants known to thrive in West Africa, which might be cultivated at a highly satisfactory profit. In one or two places experiments are now being tentatively made with some of them. British West Africa, at present, imports large quantities of rice, yet both hill and paddy rice grow luxuriantly almost all over the West Coast colonies, and the produce is declared to be of a higher dietetic value than East Indian rice. Rubber is so obvious a suggestion that I need scarcely allude to it, beyond uttering a word of warning to prospective planters that they would be well advised very carefully to consider whether it is not better, in those parts in which *Funtumia elastica* is indigenous, to plant it, rather than the exotic Para, seeing that the success of the former is assured, even though it may take longer to come to maturity than the latter; while the prospects for *Hevea brasiliensis* are still, to say the least of them, somewhat problematic in West Africa. Without dealing in detail with all the possible cultivations for which West Africa is suitable, I would merely suggest that there are parts, at any rate, where camphor, tobacco, or tea can be grown on a commercial scale. Of plants which are at present cultivated, but are not exploited as they might be in the interests of commerce,

I would mention chillies, ginger, a large number of native cereals, cassava (for starch), cocoa-nuts, kolas, and possibly coffee, though the conditions prevailing almost preclude the growing of the last mentioned at present market prices. It is of course indigenous to West Africa, and grows to perfection and without trouble, but it cannot be placed on the market to compete with the produce of countries which are not handicapped by the system of head portage. This, however, is a matter of time only. Similarly, in the not very distant future, there is a long list of tropical fruits, more particularly oranges, pine-apples, and bananas, which can be grown in a finer quality in West Africa than almost anywhere else, but are at the present debarred from commercial exploitation owing to local conditions.

## THE LEEWARD ISLANDS AND THE IMPERIAL DEPARTMENT OF AGRICULTURE.

The following correspondence has been received from his Excellency Sir E. Bickham Sweet-Escott, K.C.M.G., Governor of the Leeward Islands, covering a copy of a Resolution passed unanimously at a meeting of the General Legislative Council of that colony held on May 21, 1907 :—

*The Governor of the Leeward Islands—to The Right Hon. the Secretary of State for the Colonies.*

My Lord,—I have the honour to forward to Your Lordship a copy of a Resolution that was adopted unanimously at a meeting of the General Legislative Council on the 21st instant, recording the Council's grateful appreciation of the action of the Imperial Government in securing, for a further period of five years from September next,\* the services of the Imperial Department of Agriculture for the West Indies.

The Resolution also records the appreciation of the Council of the good work done by the officers of the Department, and especially by Sir Daniel Morris, K.C.M.G., and Dr. Francis Watts, C.M.G.

I concur most cordially in the terms of the Resolution.

I have, etc.,  
(Sgd.) BICKHAM SWEET-ESCOTT,  
Governor.

Copy of Resolution moved by the Hon. R. A. L. Warneford, seconded by the Hon. J. C. Macintyre :—

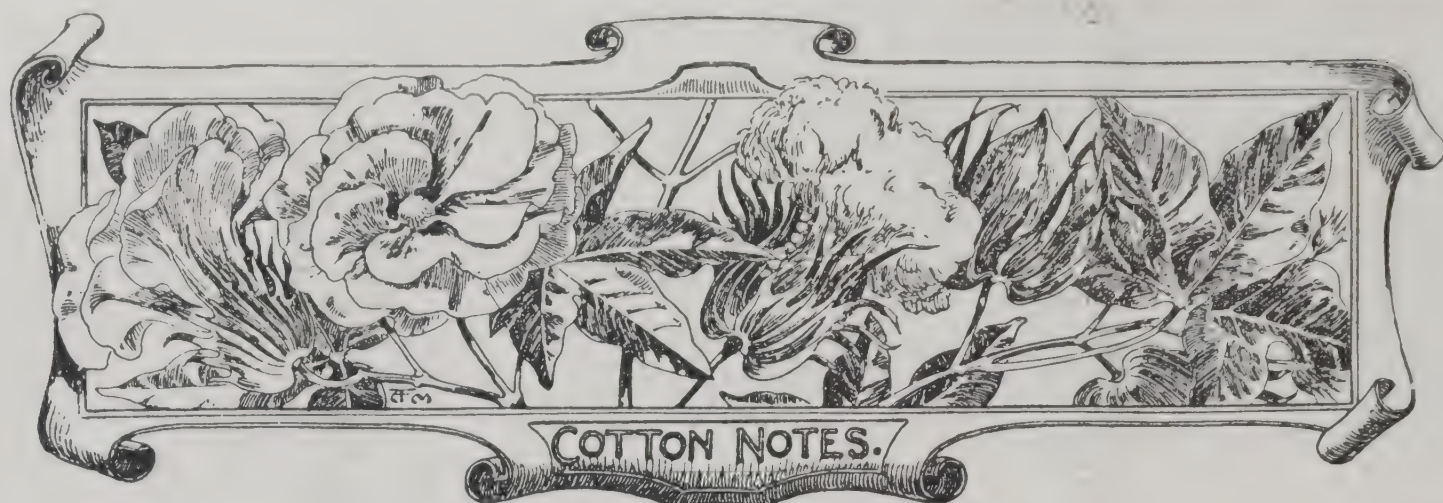
That this Council desires to place on record its grateful appreciation of the action of the Imperial Government in securing the valued services of the Imperial Department of Agriculture for the West Indies to the Colony of the Leeward Islands for a further period of five years from September next.\*

That this Council further desires to place on record its appreciation of the good work done by the officials of the Imperial Department throughout the colony, and more especially by the Hon. Sir Daniel Morris, K.C.M.G., and the Hon. Dr. Francis Watts, C.M.G., to whose able organization and administration are to be attributed the success of the Department's efforts, and the benefits thereby derived by the Colony.

That his Excellency the Governor be respectfully requested to forward a copy of this Resolution to the Right Hon. the Secretary of State for the Colonies.

\* NOTE.—The correct date is from April, 1908.





### WEST INDIAN COTTON.

Messrs. Wolstenholme & Holland, of Liverpool, write as follows, under date of June 3, with reference to the sales of West Indian Sea Island cotton:—

Since our last report of May 17, rather more business has been done in West Indian Sea Island descriptions, at the expense of prices however, as spinners are liberally supplied for this season, and are basing their offers on the contingency of a more liberal supply next year.

The future course of prices depends entirely on the prospects of the growing American Sea Island crop. The acreage planted has probably been a record one, but the weather, so far, has been decidedly bad. There is time, however, for the crop to recover.

The sales consist of Nevis at 20*d.*; Montserrat, 20*d.* to 22*d.*; Barbados, 21*d.* to 22*d.*; St. Croix, 20*d.* to 22½*d.*; St. Kitt's, 22*d.*; Antigua, 22*d.* to 23*d.*; St. Vincent, 21*d.* to 25*d.*; and Anguilla, 20*d.* to 21*d.*; with some stains from various islands at 8*d.* to 11*d.*

### COTTON PROSPECTS IN THE SEA ISLANDS.

The Sea Island Cotton Report of Messrs. Henry W. Frost & Co., of Charleston, under date June 1, 1907, contains the following note:—

The weather for the past week has been unseasonably cool for the young plant, somewhat retarding its growth. Warm and dry weather is now much needed, which it is hoped, will soon be obtained.

On June 8, they write:—

Although fair stands have been generally obtained, the crop is still reported to be three to four weeks late, and its growth is still being retarded by unseasonably cool weather.

### MANURIAL EXPERIMENTS WITH COTTON IN ST. KITT'S AND IN MONTSERRAT.

The Hon. Francis Watts, C.M.G., has forwarded a report for the year 1906-7, on the manurial experiments with cotton that were commenced in St. Kitt's and Montserrat in 1904. Complete details of the plan of manuring that is being carried out were given in the *Agricultural News* (Vol. III, p. 237), and summaries of the annual reports for 1904-5, and 1905-6, were published in Vol. IV, p. 263, and in Vol. V, p. 231, respectively.

From the time of the commencement of the experiments, each plot has been manured in an exactly similar manner every successive season, the experiments being designed to

ascertain the requirements of the cotton plant as regards (1) nitrogen, (2) phosphates, (3) potash. For purposes of comparison cotton has also been grown on unmanured plots, and on plots receiving no artificials, but a good dressing of pen manure instead. Three complete series of all the above experiments were carried out last year (as well as in previous years), the plots of the first series being planted in June, those of the second series in July, and the third series in September; this was done with the further view of ascertaining the effect that time of planting had upon the yield of the cotton crop.

As on the two previous occasions the manures seem, on the whole, to have had little influence on the yield of cotton. For example, in the first series—planted in June—the unmanured plot yielded seed-cotton at the rate of 1,620 lb. per acre, a plot dressed with a complete artificial manure—containing nitrogen, potash and phosphates in due proportion—returned 1,656 lb. per acre, while the plot which had been given ordinary pen manure produced seed-cotton at the rate of 1,980 lb. per acre. It seems obvious that the land on which these experiments are being carried out is far from being exhausted of its natural fertility, and still possesses such a supply of the elements of plant food as to be able to meet the demands made upon it by the cotton crop without needing much help from added fertilizers.

This is further borne out by the fact that the plots receiving no manure, and which have produced cotton for three successive years without manure, have yielded relatively large crops, notwithstanding that the whole produce, including the seed, has been removed from the land.

Referring to the results, Dr. Watts remarks:—

'The results again go to show that under existing conditions artificial manures are not urgently required for cotton, but that the requirements of the crop may be fully met by good ordinary agricultural methods, using moderate amounts of pen manure to maintain the soil in general good condition.'

The low return of seed-cotton obtained from the September sown area—no more than 304 lb. per acre—would certainly seem to show that planting in this month is too late for the conditions prevailing in St. Kitt's. This, too, is quite in accordance with the results obtained last year from the 'late' planting of October.

### COTTON WORM IN THE GRENADINES.

Mr. W. N. Sands, Agricultural Superintendent of St. Vincent, reports that the cotton worm, *Aletia argillacea*, was very much in evidence at Mustique last year, but it was successfully kept under by the application of Paris green and lime by means of the Acme Powder bellows.



## SEASONABLE NOTES.

It has been noticed with great interest by all who are connected with the West Indian cotton industry that the cotton grown in the island of St. Vincent has always commanded the highest prices on the market. With a view to improving the quality of their own produce, and so to secure the best return possible, many planters in the other islands have taken steps to secure their seed for the next crop from the island of St. Vincent.

Since it was recognized that the St. Vincent cotton was of such a superior character, it has been the object of the Imperial Department of Agriculture to find out what important differences exist between this cotton, and that grown in other parts of the West Indies, so that the officers of the Department, knowing what characteristics constituted the superiority of the St. Vincent product, might have something definite to work upon in their efforts to improve the quality of the cotton grown in the other islands.

St. Vincent cotton is very fine, and has an excellent lustre; but the one important character in which it differs from the cotton grown in the other islands is in the smaller proportion of weak fibres. This proportion varies around 20 per cent., while in say Barbados cotton, it varies around 30 per cent. This is of very great importance, inasmuch as it makes a considerable difference in the strength of the lint, which is the most important factor considered when judging cotton on the market.

It will be of interest to planters to learn that in the cotton selection experiments which are being carried on by this Department, the proportion of weak fibres present is a feature that is seriously taken into consideration. In last year's experiments, the best samples selected in Barbados contained 24, 25, and 26 per cent., respectively, of weak fibres. This year, however, a great improvement is noticeable, and some of the selected Barbados plants contain less than 20 per cent. of weak fibres. It cannot be definitely said that the offspring of these plants will produce cotton as satisfactory in this respect as the parent plants, but it is most probable that the proportion of weak fibres will be reduced below the previous average.

By continuing these experiments it is hoped that a stronger cotton will ultimately be produced and established, and that an improvement will also take place in those other qualities of the lint, which are considered in conjunction with the one here discussed.

## SEED SELECTION.

The matter of seed selection in cotton is one of very great importance, and in previous numbers of the *Agricultural News*, it has been repeatedly pointed out that the quality of the cotton reaped will depend largely on the seed that is planted.

The following extract from Professor Burkett's work on *Cotton* gives some idea of what may be accomplished by careful seed selection, the statements being based upon experience in the cotton-growing districts of America:—

There is indeed abundant reason for believing that the average cotton yield per acre could be increased one-fourth by only five years' wise selection of seed. We know a farmer now, who, by selecting seed from the most thrifty stalks, and having the seed ginned separately, in two years so improved the crop from the selected seed that the improvement was

easily noted and became a matter of comment by persons passing on the road.

Thus one of our State Departments of Agriculture, speaking of a five-year test of cotton varieties (with practically the same conditions of soil, manuring, and cultivation), declares that in 1900, in a test of eight varieties, the difference in the crops as between the variety yielding the largest amount of seed-cotton per acre and the one giving the smallest, was 565 lb.; in 1901 and 1902, in tests of seven varieties each the differences were 520 lb. and 790 lb. respectively; in 1903, 662½ lb. when nine varieties were incorporated; and 725½ lb. difference in 1904 in a test of twenty-one varieties.

When these figures are carefully considered, it is at once evident that great possibilities are before the scientific cotton planter who pays particular attention to the origin and selection of the seed used for planting purposes, and to other matters of importance in the production of a uniform crop of cotton of high quality.

## BARBADOS ALOES.

A recent advertisement, which appeared in one of the local papers, offering to purchase 2,000 lb. of locally grown aloes, reminds us that Barbados aloes have practically disappeared from commerce. What is known in Mincing Lane and elsewhere as Barbados aloes is probably obtained from Curaçoa and other places. From an article entitled 'The Aloe Industry of Barbados,' which appeared in the *West Indian Bulletin*, Vol. III, pp. 178-89, the following particulars are extracted:—

The Barbados aloe industry seems to have been in the enjoyment of its most palmy days about sixty or seventy years ago, for during the ten years ending 1852, the value of the aloes exported from this island was over £33,000. Shortly after this the industry rapidly declined, so much so that the value of the exports for the ten years ending 1872 was only £13,568. From 1882 to 1892 only £134 worth of aloes was exported from Barbados. The chief reason for this decline was the crude process of manufacture practised by those who grew and prepared the aloes, with the result that in a consignment of 100 gourds, the contents of no two would be of exactly the same character. The merchants whose houses formerly dealt in aloes state that such variation made commercial transactions difficult, and when the Dutch West India Islands of Curaçoa and Aruba took to producing aloes, and placed a more reliable quality of the finished article on the market, the trade was finally transferred.

The aloe is not particular as to conditions of soil, climate, etc., but will flourish where most other cultivated plants would fail to find a living. There is an extensive tract of waste, rocky land on the windward side of the island of Barbados: this region is unfavourable to most plants, being windswept and covered only with a thin soil, but it suited the requirements of the aloe—*Aloe vera* being the species grown—and this district was formerly the headquarters of the industry. Since the growth of aloes has been abandoned the land in question has practically passed out of cultivation, but it is quite probable that if special attention were paid to it, and such up-to-date methods of preparation employed as would ensure an article of reliable quality being placed on the market, the industry might be profitably revived. The cost of cultivation is not a heavy item, for the crop remains on the land for four years or so, giving an annual yield per acre which increases from 100 lb. in the first year to five times that quantity in the fourth year.



## EDITORIAL NOTICES.

Letters and matter for publication, as well as all specimens for naming, should be addressed to the Commissioner, Imperial Department of Agriculture, Barbados.

All applications for copies of the 'Agricultural News' should be addressed to the Agents, and not to the Department.

*Local Agents:* Messrs. Bowen & Sons, Bridgetown, Barbados. *London Agents:* Messrs. Dulau & Co., 37, Soho Square, W., and The West India Committee, 15, Seething Lane, E.C. A complete list of Agents will be found on page 3 of the cover.

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## Agricultural News

VOL. VI. SATURDAY, JUNE 29, 1907. No. 135.

### NOTES AND COMMENTS.

#### Contents of Present Issue.

The editorial (pp. 193-4) contains information relative to the cultivation of Sea Island Cotton in the West Indies. The points brought forward should receive careful consideration at the hands of planters during the present season.

Details as to the identity of seedling cane B. 208 at Diamond plantation, Demerara, will be found on pp. 194-5.

Notes on experiments with various varieties of fruits that are in progress at the Porto Rico Agricultural Experiment Station, are given on p. 196.

On p. 197, correspondence with reference to the Leeward Islands and the Imperial Department of Agriculture is reprinted for general information.

Cotton growers will find notes of interest on pp. 198-9. Results of manurial experiments in St. Kitt's and in Montserrat are also briefly summarized.

A short article on leaf blister-mites will be found under insect notes on p. 202.

A summary of analyses of certain oil seeds of India will be found on p. 203.

An article on p. 205 on citrus culture in volcanic districts contains interesting information with reference to the effect of the fall of volcanic ash upon insect pests.

#### Bi-centenary of Linnaeus.

The two hundredth anniversary of the birth of Linnaeus, the celebrated father of modern systematic botany, occurred on May 23 last, and this was duly honoured in every country where natural history is cultivated, more especially at the Swedish University of Upsala where Linnaeus studied medicine, and where, in later life, he became Professor of Botany.

Before the time of this botanist, the classification of plants was based upon the structure of the corolla, but Linnaeus insisted upon the importance of utilizing the arrangement of the stamens and pistils as the proper basis of classification. It was in pursuance of this idea that he published his 'System of Classification of Plants' which remained in vogue till the middle of the 19th century.

The great literary work of Linnaeus, however, was his *Species Plantarum*, in which all the plants known to him, about 7,300 in number, were arranged according to the binomial nomenclature. This work has of late years been adopted as the starting point of plant nomenclature by the International Congresses of Botanists, names published before this being neglected.

Linnaeus practised medicine in his own country with much success, and in 1742 was appointed Professor of Botany at Upsala. The King of Sweden finally raised him to the nobility.

#### Botanic Stations in the West Indies.

The following is taken from the *Liverpool Daily Courier* of May 23 last:—

The immense value of the Botanic Stations in the West Indies is evidenced by the statement that from these Stations 161,000 cacao plants have been distributed during the last five years, and 22,000 rubber plants in the same period, together with over 200,000 lime tree plants in six years.

The striking success achieved in connexion with the cotton industry has been due to the fact that, when it was first started on commercial lines, the Imperial Department of Agriculture imported sufficient selected seed from the Sea Islands to plant 7,000 acres, and practically 80 per cent. of all the selected seed sown during the last three years has been supplied by the Department through its Botanic Stations. The officers in charge of these institutions have, therefore, in a large measure, been responsible for the success attained as indicated by the quantity and value of the cotton exported to this country from the West Indies. It is interesting to note that the Department distributes specially selected and disinfected Sea Island cotton seed, ready for sowing, at 3d. per lb.

The distribution of cuttings of the best of the new varieties of sugar-cane is not included in the above. At St. Kitt's alone 170,000 cuttings have been distributed since 1899. Similar distributions, amounting in all to about a quarter of a million cuttings of the best sugar-cane varieties, have been made from the Botanic Stations at Barbados, Antigua, and elsewhere.



### Inoculation for Cattle Diseases.

According to the *Louisiana Planter* of May 18 last, the planters of Mauritius have lost such large numbers of their working live stock through the cattle disease, that the only way in which they could handle the cane crops of the island with the limited power at their command, was by laying down temporary tram lines. In a like manner in Java, some time ago, immense losses among the live stock of that island brought about a similar condition, and now, in the Philippines, the authorities are endeavouring to control the rinderpest, which has been so deadly in its effects upon the cattle and buffalo, on which Philippine agriculture practically depends. It is stated in a report from the Philippine Board of Agriculture, that during the eight months from November 1, 1905, to June 30, 1906, nearly 6,000 cattle and carabos had been inoculated, and but 245, or  $4\frac{1}{4}$  per cent. of these, died subsequently from rinderpest. For the thirteen months ending November 30, 1906, some 15,000 received serum inoculation and there were but 199 deaths, or 1.23 per cent. The general conclusion is that inoculation with the proper serum is a practical success.

### Precautions against Yellow Fever in Barbados.

The *Official Gazette* of June 20 publishes a list of rules which have been drawn up by the General Board of Health of Barbados, with a view to prevent the spread of infection from any person suffering with yellow fever.

These rules provide that, directly a person is certified by a medical man to be suffering from this disease, steps shall be taken to effectually protect him from access of mosquitos, and this protection shall be continued until it is certified that he is no longer able to impart infection to mosquitos. This will be done at the expense of the patient, and on the premises where he is at the time, unless the Board of Health, or Commissioners of Health for the parish, are satisfied from the doctor's report that the patient cannot be effectually isolated from mosquitos on those premises, in which case he will be removed to the Board's isolation hospital, provided the doctor certifies that this can be done without endangering his life.

In order to protect the affected person from mosquitos, it is provided that the doorways and windows of the patient's room shall be closed with frameworks covered with wire gauze, and all other apertures shall be pasted over with stout paper. All the other rooms of the house are, if necessary, to be fumigated, and the patient is then to be transferred to one of the fumigated rooms previously closed with gauze. It is directed too, that neighbouring houses which, in the opinion of the medical officer, should be dealt with for the destruction of mosquitos, are to be treated in the same way, and also that petroleum be poured into all receptacles where mosquito larvae may grow.

The process of disinfection recommended, consists of sealing up every opening and aperture of the infected room, and then igniting pyrethrum, placed in pans on the floor, at the rate of 1 lb. of pyrethrum to every 1,000 cubic feet of air space.

### Cotton in West Africa.

The British Cotton-growing Association has just issued a report on the experimental work that was carried out with cotton in West Africa in 1906.

In Southern Nigeria, experiments were conducted at the plantation situated at Utoba, with a view to obtaining reliable information on different varieties of cotton suitable for cultivation, prevention of insect pests, and proper manuring and cultivation of the cotton crop. Considerable damage has been done by a 'boll worm' and by 'rust,' with the result that the returns have not been so satisfactory as were expected.

It is thought that the native methods of cultivation, by which cotton is grown with other crops in the same field, possess certain advantages over cultivation on a plantation system, where no other crop is present to attract certain numbers of 'boll-worms.'

On the Gold Coast, American and Egyptian cottons have been experimented with, but it is thought that the climate is unsuitable for successful cultivation of the latter. Hybrids are being raised from crossings of the native variety with American and Peruvian kinds, and it is hoped that some of these may prove valuable.

An outline is given for the planting of cotton at Moor plantation, Ibadan, Lagos, for the season 1907. It includes variety trials, manurial experiments, hybridization experiments, and the trial of different rotations of crops between cotton.

### Monkeys at Barbados and St. Kitt's.

It is generally understood that the few monkeys that are now found in a wild state in certain parts of Barbados and St. Kitt's-Nevis are of African origin, and were probably introduced by slave ships more than 200 years ago. We are informed by Mr. C. P. Clarke, M.C.P., Barbados, that an Act for destroying wild monkeys and raccoons was passed on March 17, 1680. A further Act was passed on July 12, 1682, offering 'a reward of 5s. to be paid by the Churchwarden for every wild monkey's or raccoon's head brought to him. This latter Act was made permanent on November 6, 1684.

In 'The Natural History of Barbados' by the Revd. Griffith Hughes, A.M., F.R.S., 1750, there is the following reference, on page 66, to monkeys:—

'These are not very numerous in this island. They chiefly reside in inaccessible gullies; especially where there are many fruit trees. The greatest mischief they do to the neighbouring planters is digging out of the earth their yams and potatoes, and sometimes breaking and carrying off a great many ripe sugar-canes. As a law of this island provides a premium for destroying these, they yearly rather decrease than multiply.'

It would be useful if reliable information could be obtained as to when the African monkey was introduced into these islands. We have the authority of Dr. P. L. Sclater, F.R.S., late Secretary of the Zoological Society of London, that the Barbados monkey has been identified as a West African species and is not a native of the island.





## INSECT NOTES.

### Leaf Blister-Mites.

The leaf blister-mites, which are sometimes serious pests, are not insects, but belong to the class *Arachnida*, which also includes the Scorpions, Whip Scorpions, Spiders and Mites, the last-named forming the order Acarina. Among the members of the Acarina which are likely to come under the notice of the planter are the red spiders or harvest mites; the ticks of cattle, dogs, and poultry; the itch mites; and the leaf blister-mites. The Bête rouge, which causes so much annoyance to persons in many of the West India Islands, belongs to this order; it is not however an independent species, but represents a stage in the development or life-cycle of one of the harvest mites.

In addition to these, there will be found at times numbers of small mites attached to the bodies of insects. Locusts are frequently attacked, and members of a species of boring beetle, *Chlorida festiva*, are often found with masses of mites attached to their thorax.

The mites of other families have three pairs of legs when young, which are increased to four pairs when the insect becomes adult, but the leaf blister-mites have only two pairs of legs. These mites are very small, many of them microscopic in size. The body is composed of a small cephalo thorax, and long slender abdomen, which is made up of many segments. They live in open galls, which are generally thickly lined with very fine hairs, growing from the surface of the plant tissue infested by them.

The leaf blister-mite which attacks the cotton plant, and which first made its appearance in the cotton fields of the West Indies in 1903, is not known outside these islands, and strangely enough, it has not yet been observed in Barbados.

The leaf blister-mite when it first made its presence noticeable on the cotton plants in the West Indies, was found to be a new species, and was given the name *Eriophyes gossypii*, Banks. Since that time three other new species have been named, from specimens obtained and forwarded by the Imperial Department of Agriculture. These are the mite of the Acacia, (*Eriophyes Morrisi*, Nalepa), the mite of *Bucida burseras*,—(*Eriophyes bucidæ*, Nalepa),—and the mite of the Christmas bush,—(*Eriophyes striatus*, Nalepa). (*Agricultural News*, Vol. IV, p. 122.)

Of these, the leaf blister-mite of the cotton plant (*Agricultural News*, Vol. III, p. 266) is the only one that occurs as a pest. The black currant mite,—(*Eriophyes ribis*)—is a serious pest in England, as is also the leaf blister-mite of the pear,—(*Eriophyes pyri*)—in America. It is a curious coincidence that the leaf blister-mite of cotton occurs in those islands of the West Indies in which a similar mite affects the Acacia, while in Barbados, where *Eriophyes* has not been found on the Acacias, the leaf blister-mite of the cotton, has also not appeared.

Experiments have been made with the object of ascertaining whether or not the mite of the Acacia shows any tendency to transfer itself, and attack the cotton plant,

but so far without result. In this connexion too, it may be mentioned that a plant of Sea Island cotton has been growing for two years in Barbados under a *Bucida* tree badly infested by the *Eriophyes bucidæ*, but the former shows no sign of any attack from the pest. This would seem to indicate that these species of mite do not transfer themselves from their original host to the cotton plant.

## THE CULTIVATION OF CACAO IN UGANDA.

Experiments are being carried out at the Botanical Gardens, Entebbe, Uganda, with a view to ascertaining if the growth of cacao could be successfully introduced into that Protectorate. One of the first samples produced was sent to the Imperial Institute, London, and below is given an extract from the official report (given in *the Bulletin of the Imperial Institute*, Vol. V, No. 1) which, it will be seen, is encouraging to those who are endeavouring to bring about a trade:—

The sample, which weighed 4 lb., consisted of apparently unwashed and unpolished beans, varying in colour from pale dull pink to dark brownish-red. Traces of the saccharine pulp were in most cases still adhering to the beans. The latter were of medium size and rather shrivelled; they broke fairly readily, and the fractured surface was dark and slightly purple, indicating that the beans had not been fully fermented. The taste was much milder than that of West Indian cacao, so that the incompletely fermented condition was less important than would otherwise have been the case.

The cacao was submitted to a firm of brokers, who stated that it was 'of good appearance, reddish skin, but poor "break," rather dark and slaty.' It was valued at 76s. per cwt. in London, thus showing that it would take about the same rank as good quality Ceylon and second grades of Jamaican and St. Lucian cacaos. Consignments of similar character would probably find a very good market.

## CULTIVATION OF MAGUEY IN THE PHILIPPINES.

According to *Farmers' Bulletin*, No. 13, recently issued by the United States Department of Agriculture, excellent results have attended the introduction of the Maguey plant, *Agave cantula*, [probably an East Indian form of *A. americana*] into the Philippine Islands.

The maguey is a near relative of the sisal hemp plant, and like the sisal, it is cultivated for its fibre, which is largely used in the manufacture of binder twine, and for other cordage purposes. It is described as being stronger than coir, jute, or Russian hemp, but not quite so strong as sisal hemp, though finer in texture. The value of maguey fibre on the London market is quoted as being rather less than that of sisal hemp, but on the New York market the two are reported to be of equal value. What specially commends the cultivation of maguey to the notice of the Philippines, however, is the fact that it flourishes in the face of so many adverse conditions. Those who have been cultivating it in the Philippines claim that it will grow, and do well, through the longest periods of drought. It requires for its best development only a thin, rocky, limestone or coral soil, and will even grow in beach sand; it can be profitably produced on small farms without the necessity of employing a single animal; it is not seriously injured by any insect pest or plant disease, and it needs only a yearly or semi-yearly cultivation.



## SCIENCE NOTES.

### Bastard Logwood.

In a previous number of the *Agricultural News* (Vol. VI, p. 171) a brief article was given on the leguminous tree *Haematoxylon campechianum*, from which logwood is obtained, and reference was made to the occurrence in Jamaica of 'bastard' trees, which yield no dye.

A brief article by Drs. F. Drabble and Nierenstein on bastard logwood from Jamaica, is found in the *Quarterly Journal* of the Institute of Commercial Research in the Tropics, for April. The following extracts may be of interest:—

The structure of the wood in the specimen submitted agrees very closely with that of the true logwood. The vessels are large and well developed, and the texture of the wood is slightly more open than in true logwood. Associated with this is the rather lower specific gravity of the specimen under examination, 1.01.

A feature of considerable interest in the specimen received, is the occurrence of fungal hyphae in the lumina of the vessels, tracheids and medullary cells. In some parts of the wood these hyphae are present in very great abundance: in other parts they could not be detected. The presence of the fungal hyphae is suggestive, since the living fungus might reduce the dye with the formation of a colourless compound. We do not suggest that the absence of colour is due to the attack of the fungus. Many specimens of bastard logwood must be examined before a decision can be given one way or the other, but the presence of the fungus is worth noting.

### SISAL HEMP IN EAST AFRICA.

It appears that the growth of sisal hemp, *Agave rigida*, var. *sisalana*, is making good progress in German East Africa, and steps are being taken to introduce the industry into the neighbouring British territory. The following particulars have been taken from the *Bulletin of the Imperial Institute*, Vol. V, No. 1:—

In German East Africa where the first crop of leaves was cut in 1898, the industry has increased at such a rate that in a few years it is estimated the quantity of sisal hemp produced will amount to at least 10,000 tons, of value £350,000 to £400,000 per annum.

There appears to be no doubt too that the plant would do well in British East Africa. The Department of Agriculture at Nairobi considers that the coast lands are the most favourable places in the Protectorate for this purpose, although it is very probable that the low-lying, more inland plains will also prove satisfactory. At the Government farm at Nairobi, an experimental plot of the sisal hemp plant has been made, but it appears to grow more slowly there than nearer the coast. On the other hand, whereas the plant usually dies at the end of the fifth year near the coast, it will probably live eight to ten years at Nairobi. According to the method adopted in German East Africa however, fresh suckers are planted between the rows of the old plants after the third year, and this appears to be a plan to be recommended. The sisal hemp plant has been found to grow well in certain parts of Uganda also, where trials have been made on a fairly large scale.

### EXPORT OF PARA RUBBER SEED FROM THE EAST.

In the *Annual Report* on the Botanic Gardens, Singapore and Penang, for 1906, Mr. H. N. Ridley, Director of Gardens, Straits Settlements, gives the following particulars with reference to the export of Para rubber seed from the gardens:—

During the year a very large number of Para rubber seeds and plants were sent out to all parts of the world; of these a large number were supplied from the Botanic Garden trees; others were obtained outside from various plantations, and packed and shipped.

The packing of these seeds for long distances entailed a great amount of work, as they had to be packed in tin boxes—150 seeds in a tin—with burnt rice dust. Two tins were then enclosed in a canvas covering, addressed, and sent by post, so as to avoid the seeds being heated in the hold. This plan has been proved eminently successful, and the percentage of seed that arrived safely at long distances, such as Jamaica, Solomon Islands, West Africa, etc., has been very high.

### THE COMPOSITION OF THE OIL SEEDS OF INDIA.

The *Memoirs* of the Department of Agriculture in India, Chemical Series, Vol. I, No. 2, contain particulars of an extensive series of analyses of oil seeds, carried out by Dr. J. Walter Leather, Imperial Agricultural Chemist, from which the following abstracts relating to the ground nut, cotton seed, and castor bean have been made:—

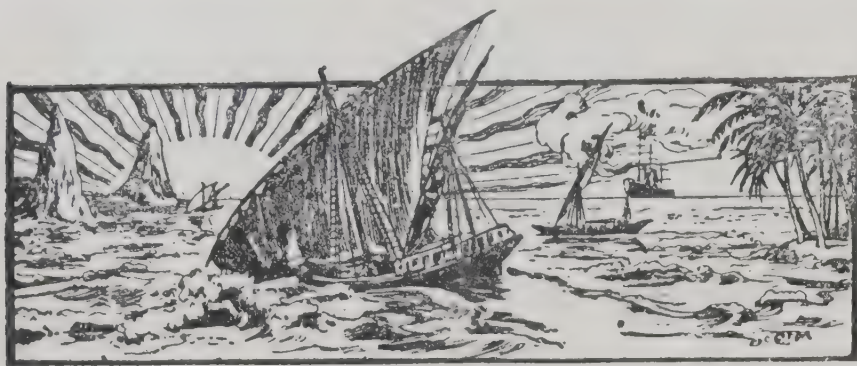
*Ground nut.*—Of the 1,900 samples of seeds examined, the results, which relate to crops grown both from imported and from native seed, show that the seed imported from Mauritius gave crops that yielded 45 to 50 per cent. of oil, while kernels of the varieties native to the Madras and Bombay Provinces seldom yielded over 45 per cent. The native Burmese varieties, however, produce seed quite as rich in oil as the imported Mauritius.

Experiments to test the advisability of substituting the native varieties by imported Mauritius seed have been commenced, but so far as one can judge from the limited results obtained, it would appear that the richer imported seeds tend to deteriorate when brought away from their native home. Barbados varieties of ground nuts, grown in Madras, produced kernels giving 46 per cent. of oil.

*Cotton seed.*—Of the specimens of cotton seed analysed, the best returns of oil were given by seed produced in the Central Provinces, viz., 19.65 per cent. on the average of fifteen samples; the average percentage of eighteen Bombay samples being 17.66, and of twenty-six from Madras only 17.4. It will be seen that the amount of oil in Indian cotton seed is much less than in American, which contains upwards of 30 per cent. The Indian seed is also smaller. Specimens of American weighed 12 to 18 grams per 100 seeds, while Indian seed weighed only 5 to 7 grams.

*Castor bean.*—Numerous specimens of this seed have been examined from the Central and from the United Provinces, as well as from Madras and Bombay. With very few exceptions the oil in the kernel was found to be from 60 to 70 per cent., and variation between these limits may be looked upon as quite small. The size of the seed varies very much, the weight per 100 seeds being as low as 9 grams in one case, and as high as 59.7 grams in another of the samples dealt with—a difference far greater than occurs in the case of most oil seeds.





## GLEANINGS.

The manager of an important rubber plantation in the Malay peninsula, has received permission from the Java government to recruit 500 coolies there to labour on his estate. (*India Rubber World*, June 1, 1907.)

The Royal Horticultural Society of England has established a Laboratory and Experiment Station at Wisley, which will be formally opened by the Right Hon. Lord Avebury, F.R.S., on July 19 next.

The *Leeward Islands Free Press* reports that considerable shipments of green limes are now being made from Guadeloupe to New York by the boats of the Quebec Steamship Company.

The *Pharmaceutical Journal* of June 8 last, states that the shipments of cinchona bark from Java to Europe, during the first five months of 1907, reached the enormous total of 7,000,000 lb.

It is claimed that the administration of minute doses of calcium chloride,  $2\frac{1}{2}$  grains per diem, has acted as a cure in three cases of tetanus in young children. The maximum dose should not be exceeded in the case of patients whose systems are already rich in calcium salts. (*Pharmaceutical Journal*, June 1, 1907.)

According to the *Port-of-Spain Gazette* of June 19 last, the West Indian Fruit Company has received two silver medals from the Royal Horticultural Society of England, for Trinidad fruits, exhibited in England in 1905 and 1906. This speaks very well for the produce sent, and shows that the fruit of Trinidad is highly appreciated in the home market.

News received from Canada respecting Beau II, the fine thorough-bred stallion obtained by the Imperial Department of Agriculture for the Stock Farm at St. Vincent, confirms what was already known as to the promising character of his colts. Regret is expressed that so fine a sire was shipped out of the province of Nova Scotia. It is to be hoped that Beau II will be equally appreciated at St. Vincent.

According to the *Sugar Planters' Journal* of May 25 last, the Waycross (Georgia) sugar factory, whose work several years ago led Dr. Wiley to the belief that good table syrup could be made without the use of any chemical, is to be run again next year as a Georgia State Experiment Station, the object being to experiment with the view of making a non-fermentable syrup. Fifty acres of cane have been planted so as to get sufficient material to work upon.

The first rubber factory to be established in the British East Indies is the Singapore Rubber Works at Singapore, at which has begun the manufacture of solid rubber tires for vehicles. The works are buying their rubber direct from the producing centres, and the cheap labour makes it possible, we are informed, to compete successfully with the American and other tires that are being imported. (*India Rubber World*, June 1, 1907.)

The production of sisal hemp has, within a comparatively few years, made Yucatan one of the richest States in the Republic of Mexico. The wonderful development of this industry is indicated by the imports of sisal hemp into the United States which were, in 1894, 48,468 tons, valued at \$3,742,073; but in 1904 had reached 109,214 tons, valued at \$15,935,555, an increase in value of 328 per cent. in ten years. (*Farmers' Bulletin*, No. 13. U.S. Department of Agriculture.)

A correspondent in the *Westminster Gazette* comments on the large numbers of horses lamed by bad shoeing, or through some unskilful smith driving a nail into the sensitive part of the foot (in this connexion see article on 'The Horse's Foot' in *Agricultural News*, Vol. VI, p. 131), and he suggests the possibility of horses being fitted with rubber shoes, which would obviously add much to their comfort, and undoubtedly prolong their period of usefulness. The writer mentions one or two experiments of his own in this direction; they are, however, of a very preliminary nature. The suggestion opens up a new field of possibilities to the rubber producer and manufacturer, as it is reasonable to hope that the idea may be applied in the future.

Investigations into the cause of what is popularly known as 'Malta fever,' with a view to establishing some method of prevention, has resulted in the discovery that the goats of the island are subject to this disease, and that in all probability these animals were the original source of it. The bacterium responsible for the fever (*Micrococcus melitensis*) has been discovered in large numbers in the milk of the goats, and as practically all the milk consumed in the island is the produce of these animals, it can easily be understood how the disease has been transmitted. Very gratifying results have followed the elimination of goats' milk from the dietary of the garrison at Malta, as the number of cases of fever has since fallen to one-tenth of what was formerly their normal number. In the West Indies, so far, no danger is apprehended from the use of goats' milk.

According to the statement of rainfall returns for Dominica during 1906, published in the *Official Gazette*, the highest rainfall for the year took place at the Lancashire Station, this being 246.66 inches, while the least fall was experienced at Batalie—only 50.68 inches. The widest difference exists as to the amount of rain experienced at the various stations during any given month, but for the greater number, September was the wettest month of the year, when Castle Bruce registered 56 inches of rain, this being the highest monthly figure recorded. A good many stations however, experienced their maximum rainfall in July. The lowest monthly figure during the wet season was that recorded at Maconcherie, 4.3 inches. February and March were the driest months. The mean rainfall of Dominica for the whole year, based on the returns from thirty-six stations, was 128.88 inches.



## CITRUS CULTURE IN VOLCANIC DISTRICTS.

Planters in Dominica will remember that some months after the eruption of Mount Pélée in 1902, a severe attack of scale insect 'blight' took place on the lime trees of the island. Mr. H. A. Ballou, M.Sc., Entomologist to the Imperial Department of Agriculture, visited Dominica at the time when the blight was at its worst, and reported that the insect chiefly responsible for the damage was the Mussel Shell or Purple scale (*Mytilaspis citricola*); the Orange Snow scale (*Chionaspis citri*), was also abundant in many cases and caused part of the damage complained of (*Agricultural News*, Vol. II, p. 232).

At the time the opinion was held by many in the island, that the heavy fall of volcanic ash had killed some of the parasitic organisms which prey upon the scale insects, thus giving the latter undue predominance for a while, until sufficient time had elapsed to restore the balance. This destruction, however, could not have been of a very wholesale character, for in the report already referred to, Mr. Ballou states that the parasites which prey upon the scale insects (and which consist of several species of lady-birds) were very generally distributed in Dominica at the time of his visit. In this connexion reference may be made to the observations, (published in the *West Indian Bulletin*, Vol. III, pp. 291-3), of Mr. H. Maxwell-Lefroy, Entomologist to the Imperial Department at the time of the Mount Pélée outbreak.

A very heavy fall of fine volcanic ash was experienced in Bridgetown on October 16, 1902, and on the following day, when the general conditions were much the same, Mr. Lefroy was at great pains to ascertain the effect of the dust upon insect life in general. He carried out his observations upon an estate which he had well collected over during the preceding six weeks, and he therefore had a good idea as to what forms of insect life were to be met with under normal conditions. Briefly stated, the conclusions arrived at by Mr. Lefroy, as a result of his investigations, were that, with the exception of the *Diptera*, *Hymenoptera*, and *Odonata*, the volcanic dust had little apparent effect on insects. They hid themselves during the actual fall of the dust, but (except those mentioned) they were as active as ever on the following day. The *Coccinellidae* generally, to which the lady-bird enemies of the scale insects belong, were—according to Mr. Lefroy—'certainly unaffected.'

The Imperial Commissioner of Agriculture lately received a letter from Mr. J. Jones, Curator of the Botanic Station, Dominica, raising the question as to how far the volcanic outbreak may have been responsible for the following attack of blight in that island, and suggesting that a comparison might usefully be made with the experience of lemon growers in the neighbourhood of Mount Vesuvius after the eruption of 1906, as this eruption was reported to have been the cause of considerable damage to the lime and lemon trees in the district.

The fact that the world's supply of citric acid is practically all grown within areas dominated by active volcanos was also referred to by Mr. Jones, in his letter, and he inquired whether this was a mere coincidence, or whether experience had proved that such localities were best suited for the growth of limes and lemons.

In reply to a letter from Sir Daniel Morris on this subject, a lengthy communication has been received—through the English Consul-General for Southern Italy—from Señor Bordiga, head of the Agricultural College at Naples, and Editor of the *Italian Agricultural Review*. Señor Bordiga

states that the Vesuvius eruption of 1906 caused little damage to the lemon and lime trees in the neighbourhood of the volcano, beyond the destruction of a certain amount of foliage and a few blossoms. It was observed, however, that the crop of fruit produced in 1906 appeared to be more than usually invaded by scale insects, especially by the *Mytilaspis citricola*, and Señor Bordiga thinks it not improbable that the volcanic ash may have had some influence in increasing the number of these insects.

It is obvious, however, that more evidence is needed before a definite conclusion can be arrived at with regard to any effect a fall of volcanic ash may have, either upon the scale insects responsible for the blight, or upon the parasitic enemies which prey upon those insects.

Referring to the fact that citric acid is almost exclusively produced in volcanic regions, Señor Bordiga is of opinion that this is merely a coincidence due to the latitude of those districts. Limes and lemons, in common with other fruit trees, do best on soils rich in phosphoric acid and potash, and as the greater number of the world's volcanic areas happens to occur in the latitudes where lemon and lime trees flourish, advantage is taken of the fact that the soil of these regions is excellently adapted to give the trees all they require in this respect.

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## COTTON AND RUBBER IN ABYSSINIA.

The *Bulletin de la Société Belge d'Etudes Coloniales*, for May last, states, on the authority of the English Consul in Abyssinia, that the western districts of that country contain large areas rich in rubber-yielding trees, these resources having been, as yet, untouched. In consequence, however, of the difficulty of obtaining native labour in Abyssinia, it is unlikely that European investors will be prepared under present conditions, to undertake the risk of trying to exploit this wealth.

It is also stated that near Dirre Dowa, cotton is being cultivated with success, and a French company is at work there growing the fibre-yielding *Sanseveria* plants. A new system of preparing the fibre has been introduced, by means of which as much as 1 ton can be turned out in six hours. This fibre has a value of from £4 to £8 per ton on the European markets, but the cost of transport is a serious expense.

Experiments are also being made, in the part of Abyssinia around the river Hawash, in the simultaneous cultivation of cotton and coffee, but attacks from locusts are a constantly threatening danger. The English Vice-consul at Harra possesses a cotton plantation in what is known as the desert of Danakil, and he believes that the growth of cotton will be a great source of wealth to the country in the near future.

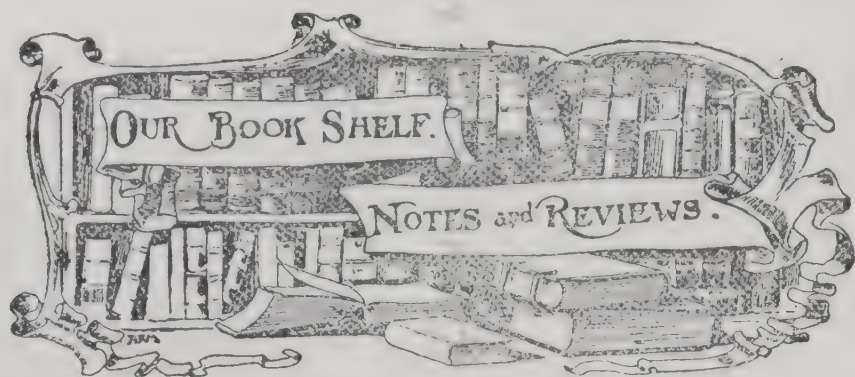
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## CANADIAN MAPLE SUGAR.

Canada is said to produce about 9,000 short tons of maple sugar, or about 70 per cent. of the world's supply of this product.

The *Louisiana Planter* of May 25 mentions that the magnitude of this industry in Canada, and the popularity of maple products, have led the Canadian Government to give the industry more consideration than it previously had done, and steps are being taken to ensure the purity of the products, in a manner similar to the efforts now being made in the United States. The industry being such a great one, it is certainly worthy of every effort for its preservation.





**RUBBER CULTIVATION IN THE BRITISH EMPIRE:** By Herbert Wright, A.R.C.S., F.L.S. London: Maclaren & Sons. Price 2s. 6d.

This little book is the reprint of a lecture delivered by Mr. Wright before the Society of Arts in London. It contains a good deal of useful information relating to the cultivation and production of rubber in all parts of the world—more especially in the British Empire. Details are given of large numbers of rubber-yielding plants and their botanical characteristics, and several methods of collecting and coagulating the latex are described.

In the first section Mr. Wright traces the increase in the world's consumption of rubber during the last seven years, showing that while in 1899 the demand was satisfied with a supply of 48,352 tons, at an average price of 4s. 3d. per lb., in 1906 the supply had increased to 62,574 tons, yet, during the same period, the average price per lb. had risen to 5s. 3d. Although up to the present time manufacturers are almost entirely dependent for their supplies upon various species of rubber-yielding trees and plants which grow wild in the tropical forests of Central America and Africa, yet the certainty of a continued increase in the demand has brought into existence great numbers of rubber-planting companies, the paid-up capital of which, according to Mr. Wright, amounts to £14,363,325.

The various sources from which rubber is obtained are next discussed, and it is shown that the forests of tropical America (Brazil, Venezuela, Bolivia, Peru, Mexico, British Honduras, and British Guiana) form at present the richest rubber-producing area of the world, yielding no less than 60 per cent. of the total supply; while tropical Africa comes next, giving 35 per cent. of the world's consumption. The amount at present obtained from Asia is insignificant. As regards the West Indies, the figures given show that Trinidad and Tobago lead the way, their exports in 1905 amounting to 9,394 lb.

**AN ELEMENTARY TEXT-BOOK ON AGRICULTURE.** By A. W. Bartlett, B.A., B.Sc., Government Botanist in British Guiana.

This booklet of sixteen pages appears primarily to have been prepared for the benefit of young children in elementary schools, but its title is somewhat misleading. It is simply and lucidly worded, and contains a fair amount of elementary information, dealing, however, not so much with agriculture proper, as with the first principles of Chemistry and Botany in their bearing upon agriculture. Thus we have sections upon—the Air and its Composition; Water; Solution; the Soil; Food of Plants; Buds; Flowers; Fruit and Seeds, etc. There are, it is true, sections headed—‘the Rotation of Crops’; ‘Fallowing,’ etc., but these are little more than definitions of the terms in question. Under the heading—‘Agricultural Tools’—the names of the implements commonly used in tropical agriculture are given, and their uses described, and the booklet closes with a list of the more common vegetable food-stuffs produced in the West Indies.

## RUBBER PRODUCTION IN THE SOUDAN.

The *Bulletin de la Société Belge d'Etudes Coloniales*, for May last, has a note on rubber cultivation in the Soudan, of which the following abstract has been made:—

Experiments in the cultivation of the rubber vine *Landolphia Owariensis* and the subsequent preparation of rubber from it, are now being carried on at Wau. Citric acid is used as the means of coagulating the latex, and a sample of the resulting product has been submitted to an expert for an opinion as to its quality. The report received is very gratifying, the opinion being expressed that the rubber is equal to any on the market. This will no doubt have a stimulating effect on planting and production in this neighbourhood. It is not yet known whether or not the Para rubber tree, which produces the best known rubber, can be grown in the Soudan, but rubber-yielding vines are much more abundant in the country than was formerly supposed, especially in Bahr-el-Ghazal.

## THE OIL PALM.

The *Agricultural Bulletin of the Straits and Federated Malay States* (Vol. VI, no. 2), contains an article on the cultivation of the African Oil Palm (*Elaeis guineensis*), and the methods adopted in the preparation of the oil from the fruit—from which the following particulars have been abstracted:—

The palm in question is largely grown in tropical Africa for economic purposes—the oil being exported to Europe, where it is used in the manufacture of the cheaper kinds of soap, as well as for candle making. In Singapore, however,—up to the present, it has been grown only as an ornamental plant, which is rather surprising, considering its economic value, and the small expense entailed in its cultivation.

The oil palm prefers a damp, somewhat marshy soil, where, however, water does not stand. In stiff clays it makes hardly any growth, and on dry, arid soils it remains stumpy, producing fruits when it is 4 feet high, instead of developing to 10 or 12 feet in height. The plants should be set out at about 20 feet apart; and, provided the soil suits them, they will soon make good growth. The trees begin to fruit about the fifth or sixth year, and are said to bear for as long as sixty years, producing three, four, or more rarely five bunches of fruit per year. In some parts of Africa the bunches of fruit produced are said to weigh about 66 lb. each, in which case one tree would produce annually about 265 lb. of fruit, containing nearly 26 lb. of oil. In another district where the returns do not appear to be anything like as good, a single tree is said to give about 40 lb. of fruit per annum, yielding about 1½ gallons of oil.

The methods adopted by the natives for the extraction of the oil appear to be very crude. Their usual course is to throw the bunches of nuts into a pit till they become somewhat decayed. The fruits are then pounded in a mortar till the husky fibres covering the nuts are loosened. They are then placed in large clay vats filled with water, and trampled on till the oil comes to the surface, when it is collected and boiled to get rid of the water. It is obvious that the quality of the oil so produced could hardly be expected to be of the best, and it is said also that 25 per cent. is lost, owing to the imperfections of the method. Quite recently, a German firm has invented a machine for the extraction of the oil, which appears to do its work very well.

The kernels of the palm nuts were formerly thrown away, but now oil is extracted from them also, and this is more highly valued than the oil of the husk.



## MURAC.

The following particulars, relating to the origin and uses of this new product, are taken from the *India Rubber World*:—

The name 'murac' has been given to a commercial product resulting from the treatment, by a new chemical process, of the latex of certain plants of the *Sapotaceae* family, said to be abundant along the Amazon river, in Venezuela and the Guianas, as well as in some of the West India Islands, Africa, Madagascar, and Australia. These trees are referred to as yielding latex freely, so that the supply is practically inexhaustible. Thus far, however, the new process is understood to have been applied only to balata.

Murac is referred to, not as a substitute for India rubber, but as being serviceable for use in connexion with low-grade qualities of rubber, bringing them up to a higher standard. Certain rubbers, for example, are mentioned as having been more than doubled in value by the addition of a few pence worth of murac to a pound in weight of the rubber to be improved. Murac, however, is vulcanizable alone, and may be used for many mechanical purposes, without the employment of other rubber, under treatment similar to that given to gutta-percha. It is also capable of being used in liquid form, particularly for water-proofing.

## ANTIGUA PRODUCTS AT THE LIVERPOOL COLONIAL EXHIBITION.

In a letter to the Hon. Francis Watts, C.M.G., concerning the Antigua stand and collection of products at the recent Liverpool Colonial Products Exhibition, Mr. A. E. Aspinall, Secretary of the West India Committee, writes as follows:—

I cannot speak too highly of the help afforded to me by Mr. W. G. Freeman, B.Sc., F.L.S., the Superintendent of the Colonial Collections at the Imperial Institute. He rendered a great service in helping me to arrange the exhibits, and in advising us generally.

I am sending you a photograph which will convey to you some idea as to how your exhibits were arranged, and I would refer you to the *West India Committee Circulars* 222 and 223, and to cuttings from the Liverpool papers which I am sending you, as these will give you further information on this point.

The Antigua stand was erected next to that of Grenada, and close to the British Guiana exhibit. It was arranged in three tiers covered with red cloth, and decorated with bunting. The arrangement depicted in the drawing sent to me was followed as closely as possible.

As already described in the *Circular* (222), the exhibition was opened on the first day by the Earl of Elgin. Sir Robert Llewelyn was also present, and he assisted the writer of this report to explain to the Secretary of State for the Colonies the various exhibits. On succeeding days the exhibition was opened by the Lord Mayor of Liverpool; Lord Latham (who took a particular interest in Antigua's exhibit); the Hon. W. P. Reeves, High Commissioner for New Zealand; the Hon. C. H. Rason, Agent General for Western Australia; and Sir Alfred Jones.

With regard to literature for distribution, your Secretary's 'Notes on Antigua' were printed, and two thousand copies were distributed.

## JAMAICA EARTHQUAKE.

In an article in the *Quarterly Journal* of the Institute of Commercial Research in the Tropics, for April, Viscount Mountmorres gives some interesting information concerning the earthquake that occurred in Jamaica on January 14 last.

After referring to the weather that was experienced on the morning of this date, a general review is given of some of the experiences of many visitors to Jamaica. It is mentioned that there was probably some connexion between violent gusts of wind which came from the south-west and the almost simultaneous earthquake shocks. Frequently it was noticed that the wind, blowing steadily from the north-east, suddenly dropped, and a squall of wind blew for a moment from the very opposite direction, and was almost invariably succeeded, at varying spaces of time, by an earthquake shock. After the shock the wind returned to the north-east.

In conclusion, Viscount Mountmorres states that:—

It will be seen that, so far as one can judge from the available data, the principal earthquake consisted of a horizontal wave which travelled, from somewhere in the neighbourhood of Port Royal Point, inland in a direction a little east of north. At some point between the harbour and North Street, the wave front began to split up, owing, no doubt, to some change in the general conformation of the ground, and gave rise to one or more reflex waves, which began to be felt somewhere about Sutton Street, as evidenced by the fact that a second wave was perceptible at the Old Mico, but not in Harbour Street. Further on, the wave either split up again, or a series of secondary disturbances was set up, due to the first splitting of the wave; and in this way, the subsequent shocks felt at Constant Spring, and at other points to the north and north-east of the town, which were not felt at all in the town itself, are accounted for.

It is obvious from what has been said as to the difference perceptible between streets running north and south, and those running east and west, that the vibration forming the wave was a transverse one, approximately east and west, so that the direction of the wave front, which travelled approximately north, was at right angles to the undulation itself. The general formation of the earth wave may thus be compared to the effect produced in a string, fixed at one end and held in the hand at the other, when a sharp lateral surge is imparted to it by a quick sideways movement of the hand. The lateral wave thus produced travels forward longitudinally through the string.

We can imagine that this would be just the effect produced in the ground if a large landslip were to occur on the face of a precipitous cliff; that is to say, that the wrenching off of an enormous mass in such a position would correspond exactly to the plucking of the string sideways at a point close to where it was held by the hand. The whole earthquake can, therefore, be readily accounted for if we imagine that some such landslip occurred on the submarine face of the steep declivity forming the island of Jamaica, at a point somewhere south-east of Port Royal.

The long series of subsequent shocks which were felt, and which apparently continue to be felt, are due no doubt to the general settlement of the ground after the disturbances caused by the first great wave.



## MARKET REPORTS.

London,—June 11, 1907. 'THE WEST INDIA COMMITTEE CIRCULAR,' Messrs. KEARTON, PIPER & Co.; Messrs. E. A. DE PASS & Co., May 31, 1907; 'THE LIVERPOOL COTTON ASSOCIATION WEEKLY CIRCULAR,' June 7, 1907.

ARROWROOT—St. Vincent,  $2\frac{1}{4}d.$  to  $2\frac{3}{4}d.$  per lb.

BALATA—Sheet,  $2/3$  to  $2/4$ ; block,  $1/10$  to  $1/10\frac{1}{2}$  per lb.

BEES'-WAX—£8 to £8 7s. 6d. per cwt.

CACAO—Trinidad,  $94/-$  to  $99/-$  per cwt.; Grenada,  $87/-$  to  $92/6$  per cwt.

CHILLIES—Dark Bombasa,  $16/-$  to  $16/6$ ; fair,  $17/-$  per cwt.

COFFEE—Jamaica, low to ordinary,  $35/6$  to  $45/-$ ; fair ordinary to middling bold,  $49/-$  to  $64/-$ ; pea berry,  $50/-$ ; Santos,  $27/-$  per cwt.

COPRA—Straits, £24; West Indian, £25 to £25 10s. c.i.f., per ton.

COTTON—West Indian, good medium,  $8.05d.$  West Indian Sea Island, good medium,  $19d.$ ; medium fine,  $20d.$ ; fine,  $21d.$  per lb.

FRUIT—

BANANAS—Jamaica,  $5/6$  to  $7/6$  per bunch.

PINE-APPLES—No quotations.

GRAPE FRUIT,  $22/-$  to  $27/-$  per box.

ORANGES— $8/6$  to  $11/-$  per box.

FUSTIC—£4 5s. to £4 15s. per ton.

GINGER—Jamaica, good medium to bold,  $90/-$  to  $96/-$ ; low middling,  $84/-$  to  $90/-$ ; ordinary to good ordinary,  $75/-$  to  $82/-$ ; ratoon,  $70/-$  per cwt.

HONEY—Dark to fair bright,  $18/-$  to  $25/6$ ; greyish to white set,  $20/-$  to  $26/-$ ; fine pale,  $27/-$  to  $28/-$  per cwt.

ISINGLASS—West Indian lump,  $1/8$  to  $1/11$  per lb.

LIME JUICE—Raw,  $1/4$  to  $1/6$  per gallon; concentrated, £25 10s. per cask of 108 gallons; Distilled Oil,  $3/4$  to  $3/6$  per lb.; hand pressed,  $4/3$  to  $4/6$  per lb.

LOGWOOD—£4 5s. to £4 15s.; roots, £3 5s. to £4 5s. per ton.

MACE—West Indian ordinary,  $1/4$  to  $1/5$ ; fair,  $1/6$  to  $1/7$ ; good,  $1/8$  per lb.

NUTMEGS— $153's$ , to  $125's$ ,  $5d.$  to  $5\frac{1}{4}d.$ ;  $121's$  to  $120's$ ,  $5\frac{1}{2}d.$  to  $5\frac{3}{4}d.$ ;  $119's$ , to  $110's$ ,  $5\frac{3}{4}d.$  to  $6d.$ ;  $110's$  to  $98's$ ,  $6\frac{1}{2}d.$  to  $7\frac{3}{4}d.$ ;  $92's$ , to  $86's$ ,  $8d.$  to  $8\frac{1}{4}d.$ ;  $82's$  to  $72's$ ,  $9d.$  to  $10d.$ ;  $73's$ , to  $65's$ ,  $10\frac{1}{2}d.$  to  $1s. 2d.$ ;  $60's$ ,  $1s. 7d.$  per lb.

PIMENTO—Fair,  $2\frac{3}{4}d.$  per lb.

RUM—Jamaica,  $2/7$  to  $2/11$ ; Demerara,  $1/0\frac{1}{2}$  to  $1/2$  per proof gallon.

SUGAR—Crystals,  $16/3$  to  $18/3$ ; Muscovado, Barbados,  $15/3$  to  $15/9$  (in barrels); Molasses,  $11/6$  to  $16/-$  per cwt.

Montreal,—April 23, 1907.—Mr. J. RUSSELL MURRAY.  
(In bond quotations, c. & f.)

COCOA-NUTS—Jamaica, \$29.00; Trinidad, \$27.00 per M.

COFFEE—Jamaica, medium, 10c. to 12c. per lb.

GINGER—Jamaica, unbleached, 16c. to 18c. per lb.

MOLASSES—Barbados,  $25\frac{1}{2}c.$ ; Antigua, 20c. per Imperial gallon.

NUTMEGS—Grenada, 110's, 17c. per lb.

PIMENTO—Jamaica,  $5\frac{3}{4}c.$  to 6c. per lb.

SUGAR—Grey crystals, 96°, \$2.50 per 100 lb.

—Muscovados, 89°, \$2.03 per 100 lb.

—Barbados 89°, \$2.60 to \$2.70 per 100 lb.

New York,—May 31, 1907.—Messrs. GILLESPIE BROS. & Co.

CACAO—Caracas,  $18\frac{3}{4}c.$  to 20c.; Grenada, 18c. to 19c.; Trinidad,  $19\frac{1}{2}c.$  to 20c.; Jamaica,  $16\frac{1}{4}c.$  to  $16\frac{3}{4}c.$ ; Dominica,  $18\frac{1}{4}c.$  per lb.

COCOA-NUTS—Jamaica, \$27.00 to \$28.00; Trinidad, \$25.00 to \$26.00 per M.

COFFEE—Jamaica ordinary,  $7\frac{1}{4}c.$  to  $7\frac{1}{2}c.$ ; fair to good ordinary, 8c. to 9c.; Rio No. 7,  $6\frac{3}{4}c.$  per lb.

GINGER—Small to bold scraggy root, 14c. to  $14\frac{1}{4}c.$ ; small to bold bright,  $14\frac{1}{4}c.$  to  $15\frac{1}{4}c.$  per lb.

GOAT SKINS—Jamaica, 56c.; Antigua, and Barbados, 56c.; St. Kitt's, St. Thomas, and St. Croix, dry flint, 53c. to 54c.; heavy dry salted, 42c. to 44c. per lb.

GRAPE FRUIT—Jamaicas, \$5.00 to \$8.00 per barrel; \$3.00 to \$4.00 per box.

LIMES—\$6.00 to \$7.00 per barrel.

MACE—35c. to 40c. per lb.

NUTMEGS—105's to 110's,  $12\frac{1}{4}c.$ ; 110's, to 115's,  $11\frac{1}{2}c.$  to 120's,  $10\frac{1}{2}c.$ , broken,  $1\frac{1}{4}c.$  per lb.

ORANGES—Jamaica, \$2.08 to \$2.50 per box; \$4.00 to \$5.00 per barrel.

PIMENTO— $5\frac{1}{4}c.$  per lb.

SUGAR—Centrifugals, 96°, 3.90c. to 3.95c.; Muscovados, 89°, 3.40c. to 3.45c.; Molasses, 89°, 3.15c. to 3.20c. per lb., duty paid.

## INTER-COLONIAL MARKETS.

Barbados,—June 24, 1907.—Messrs. T. S. GARRAWAY & Co., and Messrs. JAMES A. LYNCH & Co., June 3.

ARROWROOT—St. Vincent, \$4.25 to \$4.75 per 100 lb.

CACAO—Dominica, \$18.00 per 100 lb.

COCOA-NUTS—\$14.00 to \$18.00 per M. for husked nuts.

COFFEE—\$10.00 to \$10.50 per 100 lb.

HAY—\$1.30 to \$1.40 per 100 lb.

MANURES—Nitrate of soda, \$62.00; Ohlendorff's dissolved guano, \$55.00; Cotton manure, \$42.00; Cacao manure, \$42.00 and \$48.00; Sulphate of ammonia, \$72.00 to \$75.00; Sulphate of potash, \$67.00 per ton.

MOLASSES—16c. per gallon.

ONIONS—Antigua, strings, \$5.25 per 100 lb.

POTATOS, ENGLISH—\$3.00 to \$3.25; Canadian, \$2.40 to \$2.75 per 160 lb.

PEAS—Split, \$5.75; Canada, \$3.10 per bag.

RICE—Demerara, \$5.50 (180 lb.); Ballam, \$6.00 to \$6.10 per bag (190 lb.); Patna, \$3.75 to \$3.90; Rangoon, \$3.00 per 100 lb.

SUGAR—Dark crystals, \$2.30; Muscovado, \$1.85 per 100 lb.

SYRUP— $17\frac{1}{2}c.$  per gallon.

British Guiana,—June 22, 1907.—Messrs. WIETING & RICHTER.

ARROWROOT—St. Vincent, \$10.00 per barrel.

BALATA—Venezuela block, 32c.; Demerara sheet, 48c. per lb.

CACAO—Native, 17c. to 18c. per lb.

CASSAVA—No stock.

CASSAVA STARCH—\$8.00 per barrel.

COCOA-NUTS—\$12.00 to \$16.00 per M.

COFFEE—Creole, 14c. to 15c.; Jamaica,  $13\frac{1}{2}c.$  per lb.

DHAL—\$5.50 per bag of 168 lb.

EDDOS—\$1.08 to \$1.44 per barrel.

MOLASSES—16c. per gallon.

ONIONS—Lisbon, 7c.; garlic, 8c. per lb.

PLANTAINS—20c. to 48c. per bunch.

POTATOS, ENGLISH—Nova Scotia, \$5.00 per barrel.

POTATOS, SWEET—Barbados, \$1.56; Creole, \$1.20 per bag.

RICE—Ballam, \$6.50 per 177 lb.; Creole, \$5.50 per bag (ex store); Seeta, \$5.50 to \$6.00; per bag.

SPLIT PEAS—\$5.90 per bag (210 lb.).

TANNIAS—\$2.40 per bag.

YAMS—White, \$2.88; Buck, \$1.68 to \$3.36 per bag.

SUGAR—Dark crystals, \$2.50 to \$2.55; Yellow, \$2.90 to \$3.10; White, \$2.88 to \$4.00; Molasses, \$2.00 to \$2.20 per 100 lb. (retail).

TIMBER—Greenheart, 32c. to 55c. per cubic foot.

WALLABA SHINGLES—\$3.50 to \$5.50 per M.

Trinidad,—June 22, 1907.—Messrs. GORDON, GRANT & Co.

CACAO—Ordinary to good red, \$19.75 to \$20.50; (110 lb.); Venezuelan, \$19.75 to \$20.00 per fanega.

COCOA-NUTS—\$21.00 per M., f.o.b.

COCOA-NUT OIL—\$1.08 per Imperial gallon (cask included).

COFFEE—Venezuelan, 8c. to  $8\frac{1}{2}c.$  per lb.

COPRA—\$4.10 to \$4.25 per 100 lb.

DHAL—\$4.40 to \$4.70 per 2-bushel bag.

ONIONS—\$4.00 to \$4.50 per 100 lb. (retail).

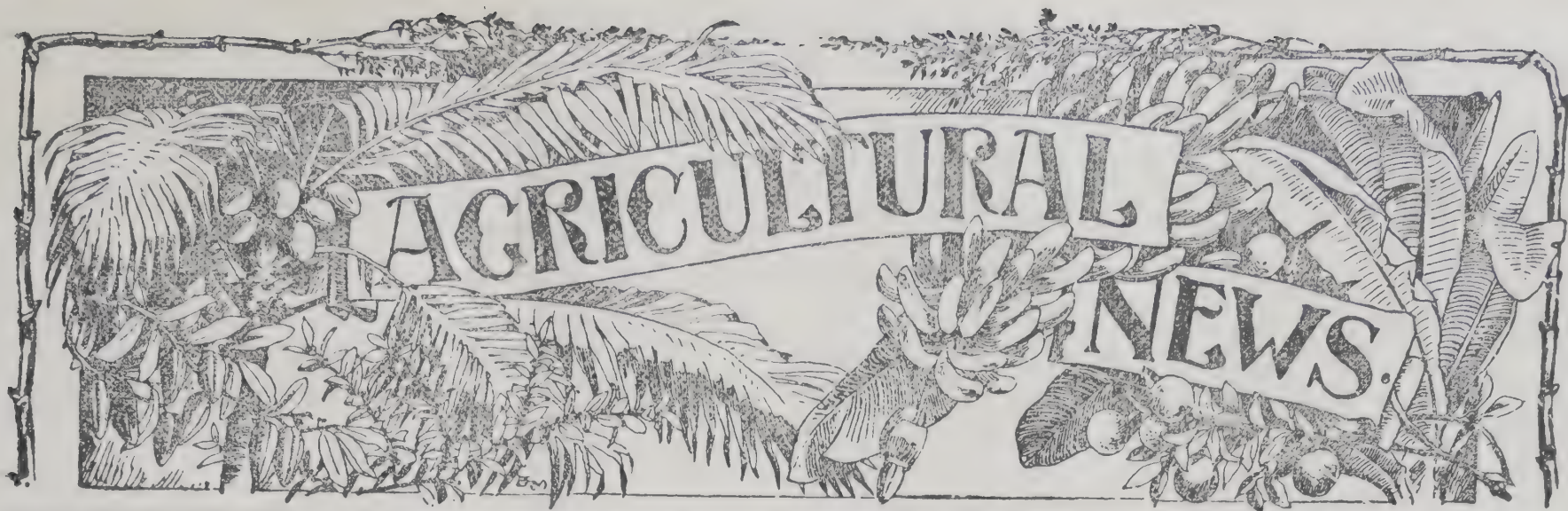
POTATOS, ENGLISH—\$2.00 to \$3.00 per 100 lb.

RICE—Yellow, \$5.60 to \$6.00; White, \$5.75 to \$6.00 per bag.

SPLIT PEAS—\$5.50 to \$5.60 per bag.

SUGAR—Crystals, \$2.00 to \$2.50 per 100 lb.





## A FORTNIGHTLY REVIEW OF THE IMPERIAL DEPARTMENT OF AGRICULTURE FOR THE WEST INDIES.

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### Rice Growing in British Guiana.

**I**N the *Agricultural News* for June 30, 1906, (Vol. V, pp. 193-4) attention was drawn to the rapid extension of rice growing in British Guiana in recent years. Latterly, this extension has been of a phenomenal character, and British Guiana rice is now being exported in appreciable quantities to the neighbouring colonies.

Returns made to the Board of Agriculture have shown that the acreage under rice had increased from about 6,000 acres in 1900 to about 24,000 acres

in 1906. It is estimated that this year (1907) about 26,000 acres of rice will be under cultivation in British Guiana.

The rice hitherto grown is an acclimatized variety which combines hardiness with a large yield per acre. It is known as 'creole' or 'Berbice' rice. As compared with lately introduced varieties grown at the Experiment Stations, creole rice has proved superior to any. On unmanured land it yielded 5,100 lb. of paddy and 25,000 lb. of straw per acre. The yields of the new varieties, even with manure, varied from 2,800 lb. of paddy and 12,000 lb. of straw, to 4,100 lb. of paddy and 13,100 lb. of straw, per acre. The report on the experiment states: 'None of these (introduced) rices can be regarded as advisable substitutes for the local variety.'

The presence of East Indian coolies, now comprising nearly one-third of the total population, introduced to work on sugar estates, has been the means not only of bringing to the colony the knowledge and experience of rice growing from India, but it also provides a considerable market for the local product. In former years large quantities of rice had to be imported from the East Indies to provide food for the coolies. With the large increase in the production of locally grown rice, the imports are gradually, but steadily, decreasing. For instance, seven years ago (1899-1900) the imports of rice were a little over 25,000,000 lb.; last year (1906-7) they had fallen to a little over 6,000,000 lb., showing that during a comparatively short period the imports had shrunk more than 75 per cent.

According to the report of the Comptroller of Customs, rice was first exported from British Guiana in 1902-3, amounting to 10,506 lb., of the value of \$290.04. In 1904-5 the exports reached 61,225 lb.,



of the value of \$1,709.44; while in 1906-7 the increase was enormous, the exports amounting to 3,474,512 lb., of the value of \$89,078.21 (£18,000).

It is gratifying to learn that while British Guiana rice is being consumed locally, and is taking the place of imported rice, it is also making a good name for itself in the British West Indies, and in the French and Dutch Guianas. As is pointed out in the *Argosy*, 'rice growers have now every chance to secure for their produce as good and lasting a reputation as the sugar planters have won for the world-famed Demerara crystals.'

Another gratifying feature of the extension of rice growing is that by means of it some of the front lands of the colony that are not regarded with special favour for sugar growing may be utilized for the growth of rice. Also, it is evident that British Guiana need not any longer regret its inability to grow the best varieties of Sea Island cotton, as it has at hand a young and promising enterprise that is exactly suited to local conditions, and likely to prove even more advantageous than a cotton industry. This is in accordance with the anticipations already placed on record by the Imperial Department of Agriculture, and on that account the Department looks forward with great interest to the splendid future of the rice industry of British Guiana.

In starting new agricultural industries, the first requisites are to ascertain fully, beforehand, whether the local conditions as regards soil, rainfall, and labour supply, are exactly suited to the industry; also whether the produce is of such a quality, and capable of being produced at such a price, as will enable it to compete successfully in the markets of the world. If these requisites were more generally recognized as essential before embarking in new industries, there would be far fewer failures to be placed on record in these colonies. Usually it is taken for granted that because, say, Sea Island cotton of excellent quality, and obtaining the highest prices, can be grown in one part of the West Indies, similar results can be obtained everywhere in the West Indies. The fallacy of this is obvious, but the lesson is one that apparently can only be learnt by actual experience, often entailing considerable loss both of time and of money.

We may accept the fact as established, that British Guiana is most favourably situated for the production of a good marketable rice, and, given a sufficiency of labour, good drainage and irrigation, the industry is destined to develop into a most valuable adjunct to the sugar industry. It will also probably absorb the labour

of negroes and others at present not utilized in any other direction. There are enormous areas in British Guiana pre-eminently suited for rice cultivation, and it is not beyond the bounds of possibility that in future years the colony may become the granary of the West Indies, in the same way that the cotton-growing islands in the West Indies bid fair to produce all the best qualities of Sea Island cotton required by manufacturers in the United Kingdom.

The lesson to be learnt from the rapid growth of these two comparatively new industries is that the prosperity of the West Indies and British Guiana can be most surely and effectually reached by a careful and exhaustive study of their natural resources, and by the aid of scientific methods of agriculture exactly adapted to their special needs and requirements.

The success of rice growing in British Guiana not unnaturally suggests that something might be done in the same direction to encourage a similar industry in the neighbouring colony of Trinidad, where more than two-fifths of the total population of 255,148 is composed of East Indian or coolie immigrants.

From a Statement of Imports into Trinidad during the year ending March 31, 1906, there were imported for home consumption 26,205,684 lb. of rice, of the value of \$707,106 (£117,851).

At the Agricultural Conference held at Trinidad in 1905, Dr. Morton stated that 'the cultivation of swamp rice had increased rapidly in Trinidad in recent years, and that 30 barrels of 'Nagra' rice in the husk, 24 of 'Chittagong', and 15 of Upland rice, per acre, may be taken as a good crop; equal to about one-half the above numbers of bags when cleaned. In Trinidad native rice is generally sold in the husk (paddy). The price in January, 1905, was \$2.00 per barrel, but it varies with the price of imported rice. Milling has been tried on the Caroni savanna, but the effort is at present in abeyance.' Dr. Morton adds: 'The seed used in Trinidad has become greatly mixed, different varieties being very commonly grown together. Something should be done to help this industry by drainage of lands that flood, by improved seed, and by devices for the conservation of the surplus water against a time of drought.'

There is also a population estimated at about 12,000 East Indian or coolie immigrants in the island of Jamaica. The imports of rice into that colony for the year ending March 31 last, amounted to about 10,000,000 lb., of the value of £44,000. It is evident that in Jamaica, the cultivation of rice in certain districts in St. Elizabeth and Westmoreland would be likely to prove a remunerative and successful industry.



## SUGAR INDUSTRY.

### Sugar-cane Experiments in the Leeward Islands.

Reference has been made to the first part of the official report on the sugar-cane experiments carried out at Antigua and St. Kitt's during the year 1905-6, in a previous number of the *Agricultural News* (Vol. VI, p. 152).

Seedling canes B. 156, D. 109, Sealy Seedling, and B. 208 gave the best results as plant canes at Antigua, while in the ratoons, D. 109, Sealy Seedling, and B. 156 were worthy of special attention. At St. Kitt's, B. 254, and B. 208 gave the most satisfactory returns as plant canes; while as ratoons, D. 95, D. 74, and White Transparent yielded the best results.

The *Louisiana Planter* of May 25, in speaking of this report of Dr. Watts' on the sugar-cane experiments in the Leeward Islands, which it had received from the Imperial Commissioner of Agriculture for the West Indies, refers to it as 'a handsome volume which has been carefully compiled, and which is a valuable work of reference.'

### Sugar Industry in Porto Rico.

The following note, with reference to the progress of the sugar industry in Porto Rico, is taken from the British Consul's *Report* for 1906:—

During the year two new sugar factories were completed and started work, and while three others are in course of construction with the view of handling the coming crop, at least two others are definitely planned for operation in 1908.

Besides these additions, most of the old factories have been, or are in course of being, refitted with modern machinery. Modern agricultural methods are in course of adoption generally, by means of which it is to be expected that the Porto Rican sugar yield can be brought to equal that of Hawaii, which is due, in the greater part, to scientific culture and the generous use of appropriate fertilizers.

The value of sugar and molasses exported from Porto Rico during the fiscal year ended June 30, amounted to £2,983,583, showing an advance of £503,755 upon the previous year.

With the exception of a very small proportion, the whole was shipped to the United States.

### Irrigation in Hawaii.

Sugar planters in Hawaii have, in the past, often suffered from shortness of the rainfall, and extensive irrigation works are now in course of construction in those islands, to ensure that the sugar crop shall have a sufficient supply of water in the future. The following particulars are taken from the last *Annual Report* of the British Consul at Hawaii:—

Until the past year there had been no artificial irrigation of the sugar-cane on the island of Hawaii, dependence being placed entirely on the rainfall, which at times has fallen short of the requirements of the crop. Even yet there is little irrigation possible in that island, but in the Kohala district, where about 14,000 short tons of sugar were produced in 1906, irrigation has been made possible by the completion of a canal, which conveys into the district, and through the lands of the plantations at an altitude of about 1,000 feet, a considerable quantity of water gathered from the head

waters of mountain streams. With this water it is the intention of the Kohala planters to irrigate considerable areas of land, hoping in that way to make sure of their crops and possibly to increase them.

In the district of Hamakua, also on the island of Hawaii, there is now being constructed a canal somewhat similar in character to that in Kohala, and there is talk of further cutting in that neighbourhood, the wish of the plantation owners being to have an abundance of water for the conveyance of their cane by flume to the factories, as well as some for irrigation purposes, where the contour of the land makes irrigation possible.

On the islands of Oahu, Maui, and Kauai, almost all cane is grown on irrigated lands. The water for this irrigation is obtained from artesian wells, from tunnels, or drifts, run into the face of 'bluffs,' and by means of canals which bring the supply of water from considerable distances where there are mountain streams, or where the rainfall exceeds that of the particular districts in which the cane is cultivated. Apart from the Kohala canal above mentioned, there are canals of considerable magnitude on the islands of Maui and Kauai, as well as a few smaller canals.

### Sugar in Mauritius.

The *Louisiana Planter* of June 15 last, contains the following reference to the present condition of the sugar industry in Mauritius:—

The Mauritian sugar crop, which has recently reached above the 200,000 tons limit, having risen in the last three years from a total production of 142,000 tons, is at present very much depressed on account of the large crop, and the diminishing market. In fact, it seems that some slanderous statements have been circulated among the Hindus as to the process of manufacture adopted in the production of Mauritius sugar. Forty years ago Dr. Icery introduced the sulphur process into Mauritius for the express purpose of avoiding the scruples of the Hindus against consuming sugar that had been brought in any way in contact with animal matter, such as bone black or blood, which are sometimes used in refining. German beet and Java cane sugars, made without bone black, have been invading the East Indian white sugar market, and the Mauritians have no consuming country of any extent open to them excepting Great Britain. It looks as though the planters of Mauritius would be compelled to come into competition with all the rest of the world in the markets of Great Britain.

### Sugar Production in Formosa.

The Japanese have recognized the fact that Formosa is admirably adapted for sugar production, and they have a great desire to make the island the source of all the sugar used in Japan.

The *Louisiana Planter* of June 22 states, that with this object in view, fresh steps are continually being taken by the Government towards the promotion of the sugar industry. A Sugar Bureau has been established with an able man at the head of it; new varieties of sugar-cane are being distributed to those desiring them; subventions are offered to planters willing to undertake the cultivation of the cane; and increased duties have been placed on foreign sugars imported into Japan, while the Formosan sugars come in without duty. The area in sugar-cane at present is estimated at about 88,000 acres, and during the year 1906, about 90,000 short tons of sugar of all kinds were made in Formosa, against about 60,000 short tons the year before.





## WEST INDIAN FRUIT.

### PINE-APPLE GROWING IN JAMAICA.

An article by Mr. George L. Lucas in the *Bulletin of the Department of Agriculture, Jamaica*, (Vol. V, parts 2 and 3) discusses the position of the pine-apple industry of Jamaica, and asserts that while every condition favourable to the growth of fruit of the best quality exists, very poor success has, so far, been achieved, this being almost entirely due to the fact that unsuitable varieties have been cultivated, to the exclusion of more promising varieties. Below is given an extract from the article in question:—

Jamaica is capable of growing the finest pine-apples in the world, and whilst Cuba, the Bahama Islands, Florida, and Porto Rico have for many years produced millions of splendid pine-apples, which have yielded, and are still yielding, the growers substantial incomes, and paying well on the investments, Jamaica has had little but failure to show.

The repeated failure to make the pine-apple business a success in Jamaica can only be due to persistency in ignoring the one profitable and marketable pine-apple. In spite of every warning by those who have some knowledge, and who have made the growing of pine-apples a success, added to the fact that 90 per cent. of all the pine-apples grown in the countries above mentioned consist of the Red Spanish variety, no attempt has ever been made to grow this profitable fruit in Jamaica upon a commercial scale.

The Red Spanish pine-apple, whilst not perfect, is the only fruit that possesses such merit as to warrant other growers in placing their dependence in it, and has proved profitable to those who have cultivated it exclusively. It is a fruit of good appearance, being globular, with large shallow eyes, flesh white and firm, flavour sprightly and agreeable, with the true pine-apple bouquet so sought after by the foreign consumer. This variety grows to a large size, and makes an excellent appearance with its large crown or top. It is a splendid shipper, and the best seller that has been found among fifty-three varieties that have been tried and tested in the years gone by.

The Red Spanish plant is vigorous, free from disease, and easy to grow, and with proper cultivation, will yield as high as 95 per cent. of marketable fruit in twelve months after planting, and the fields will continue to yield profitable crops for five to six years, which no other variety will do.

In view of the foregoing facts, it is unwise to grow for shipment any other variety of pine-apple but the Red Spanish. It must be borne in mind that the pine-apple grower is expected to supply the consuming public with what they are willing to pay for, and no matter how well the Ripley may be thought of in its native land, we cannot afford to bring

sentiment into any business that is expected to pay a profit on the outlay. On the whole, the pine-apple business in Jamaica has been most severely and unjustly condemned by those who were supposed to know something about agriculture, and who, had they listened to reason, would not have left the island and published their failures far and near, blaming Jamaica for all their shortcomings, and intimidating those who might otherwise have felt inclined to invest their money in a business that, if properly conducted, should to-day be one of Jamaica's principal industries.

### FRUIT EXPERIMENTS IN PORTO RICO.

As mentioned in the last issue of the *Agricultural News* (Vol. VI, p. 196), a very extensive series of experiments with different kinds of fruits is being carried out at the Porto Rico Agricultural Experiment Station. The following particulars, extracted from the last *Annual Report* of the station, relate to experiments with avocado pears, oranges, and grapes, that are now being made:—

The last unoccupied land in the orchard has this year been planted to avocados, some of the better varieties found on the island here being collected and budded in the nursery. Several methods of budding have been tried, and while almost any method is fairly successful on the avocado, the shield bud gives uniformly good results, and will probably be largely employed because it is familiar to most growers.

Most of the oranges produced in Porto Rico come from the mountain districts, where the trees are neither cultivated nor manured. While the fruit is often of very good quality, a great portion of it is not very firm, and does not ship well. Experiments are now under way in which such trees are being manured and cultivated, and in some places with the special object to show the influence of potash on the shipping quality of the fruit.

Many varieties of grapes are being tried here, and others have been observed in different parts of the island, and the following facts may be noted. *Phylloxera* seems to be absent, but mildew attacks all varieties. Some varieties seem much more resistant than others and should therefore be selected and planted in locations to which they are adapted. The question of selecting varieties for localities is usually lost sight of. If a variety succeeds well in the cool, moist, mountain districts, it could not reasonably be expected to succeed in the hot, dry plains near the seacoast. With well-adapted table varieties, and judicious spraying, grape growing could no doubt be made profitable. It must not be forgotten, however, that local experience is necessary in order to succeed.



### CITRATE OF LIME.

With the view of placing information which is likely to be of value, within reach of those interested in the production of Citrate of Lime, the following letter and its enclosure are published in continuation of previous notes on the subject (*Agricultural News*, Vol. V, pp. 268 and 324; Vol. VI, pp. 8, 27, 83 and 136. Also *West Indian Bulletin*, Vol. VII, pp. 331-7).

The Powers-Weightman-Rosengarten Company, who have obligingly contributed the information given below, are manufacturing chemists in the United States, who have already taken a keen interest in the preparation of citrate of lime in the West Indies:—

*The Powers-Weightman-Rosengarten Company, Philadelphia, U.S.A.—to the Imperial Commissioner of Agriculture for the West Indies.*

Philadelphia, June 15, 1907.

Replying to your favour No. 2,214, of June 3, we are very pleased to give you the information you desire, and do so to the best of our ability. We also call attention to the enclosed printed circular, which may prove of interest, and which we are in the habit of sending to those who make inquiries concerning citrate of lime.

The cost of a citrate plant cannot be very great, and we believe the money spent in installing the same would be quickly returned through the increased economy and efficiency.

Citric acid contained in citrate of lime sells at a higher price than that contained in concentrated juice.

We would give preference to citrate as against concentrated juice, and the tendency is strongly set in that direction, and will remain so.

We have never determined the saving in making citrate, but have always considered it to be at least 10 per cent.

You may use the information as you think best: we are desirous of assisting the planter in every way possible.

Below is given a copy of the circular referred to as being enclosed in the above letter:—

#### CALCIUM CITRATE OR CITRATE OF LIME.

In some places citrous juices are simply concentrated in copper kettles over an open fire. This concentrated juice is placed in suitable containers and shipped to us. We cannot recommend concentration, as some of the acid is destroyed, and the evaporated juice is not as valuable per unit of citric acid contained, as the product we now describe, viz., calcium citrate.

Calcium citrate is a combination of calcium and citric acid. Its most useful property is the fact that it is insoluble in hot water; hence, when the proper calcium salt (chalk, whiting or slaked lime) is added to a boiling liquor containing citric acid, the liquor is robbed of its acid and the latter is recovered in the form of calcium citrate.

It is necessary to have a steam boiler, useful for generating steam rather than for power; the steam from this boiler is used:

1. To heat the juice in a still, in order to drive off the oil.

2. To keep the juice boiling hot whilst it is converted into calcium citrate.

3. To heat water with which the calcium citrate is washed.

4. To heat the driers where the product is dried.

We now describe the method for producing calcium citrate from limes, waste lemons, etc. This method might be subject to changes according to conditions with which we are not at present familiar.

The material is pressed between the rollers of an old sugar mill; a cider press will also suffice. The juice is run into the still (made of copper or lead), where a short boiling removes the oil which is collected at the end of a copper condenser; the boiling juice is run through strainers made of brass wire into suitable wooden tanks, where it is neutralized with chalk, or lime, etc. During neutralization the mass is kept as hot as possible by means of a jet of live steam.

When the operation is complete the contents of the tank are permitted to settle; the clear liquid is syphoned off and run away; boiling water is added to the sediment, steam permitted to play through the mass; and after permitting settlement, the wash water is run away. The hot mass is now run into filter bags, which are securely closed and placed in a convenient press (a cider press is sufficient). The expressed pulp is now placed on the driers, and when dry is packed into suitable containers.

The drying is carried out in flat, double-jacketed pans, made of wrought or cast iron, which are so arranged that the pulp may be easily worked over with a spade, and thoroughly dried.

The difficult part of the operation is to ascertain the point of neutralization, viz., that point when enough chalk or lime has been added to ensure full combination with the acid, and yet not enough to cause a great excess. With a little experience, this point is easily found by tasting a sample of the contents of the vat. A sour taste indicates that the acid has not all been converted into citrate, and more chalk must be added. When the sour taste is replaced by a distinctly bitter, disagreeably characteristic taste, the acid has been removed from the liquor.

A further test is to take from the vat a sample of the clear liquor, and also a sample of the sediment. If, when more chalk is added to the hot sample of clear liquor, effervescence takes place, there is still free acid in solution.

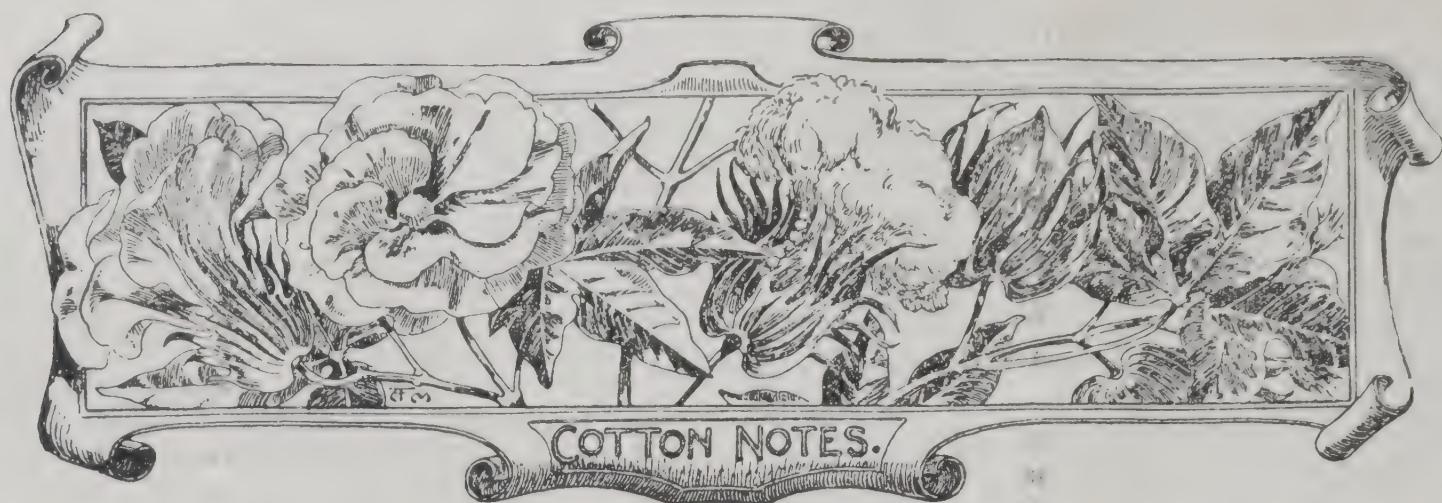
If, on the other hand, hot, raw juice is added to the sediment, and decided effervescence takes place, there is an excess of chalk present.

### CACAO CULTIVATION IN ST. VINCENT.

The details given below, relating to the cacao industry of St. Vincent, are abstracted from a letter, written by Mr. W. N. Sands, Agricultural Superintendent in St. Vincent, to the *West India Committee Circular* of date June 11 last:—

Cacao is not grown on a large scale in St. Vincent, the lands of the island being very light generally, and not retentive enough for this plant. On well sheltered spots containing a good depth of rich soil, however, cacao thrives fairly well. Previous to the hurricane of 1898, 1,500 bags of cured cacao were exported per annum. The hurricane of 1898, however, destroyed most of the plantations, and those that had somewhat recovered were in 1902-3 severely damaged by the eruptions of ash, etc., from the Soufrière. Notwithstanding these two set-backs within a comparatively short space of time, cacao planting has still gone on, and the exports have shown a gradual increase, for while in 1900 only 443 bags were exported, this year—admittedly an unfavourable one—the exports totalled 1,129 bags, of an estimated value of £3,838. A large number of cacao plants have been distributed free every year by the Imperial Department of Agriculture, and advice and instruction in planting given. Last year it was estimated that over 50 bags were produced, and provided no catastrophe occurs, a substantial increase is to be looked for from year to year.





### WEST INDIAN COTTON.

Messrs. Wolstenholme & Holland write as follows, under date of June 24, with reference to the sales of West Indian Sea Island cotton:—

Since our last report, a good business has been done in West Indian Sea Island descriptions.

Spinners were holding off, but at the slightly easier rates now ruling, they have elected to increase their stocks, which are still considerable.

From latest accounts, the American Sea Island crop, comprising the Carolinas, Florida, and Georgia combined, promises to reach 100,000 bales, as against 57,000 bales last year.

The sales consist of Barbados at 16*d.* to 23*d.*; Antigua, 21*d.* to 24*d.*; St. Vincent, 18*d.* to 27*d.*; Nevis, 15*d.* to 22½*d.*; St. Kitt's, 15*d.* to 23½*d.*; Barbuda, 19*d.*; Montserrat, 15*d.* to 23*d.*; St. Thomas, 19*d.* to 20½*d.*; Anguilla, 21*d.*; St. Martin, 18*d.* to 20*d.*; with stains from various islands at 7½*d.* to 12*d.*

### SEA ISLAND COTTON.

The following is a summary of the reports received by Messrs. W. W. Gordon & Co., of Savannah, on the condition and prospects of the present crop of Sea Island cotton in Georgia, Florida, and the Sea Islands, as contained in their Sea Island Crop Circular, dated June 22, 1907:—

The Georgia counties, where Sea Island cotton is regularly grown, report a small increase in acreage. These counties number about fourteen, and produce the bulk of the Georgia Sea Island crop. There are eight counties where Sea Islands are occasionally produced. Last year practically no Sea Island cotton was grown in these counties, but this year there has been a decided increase, which, in the aggregate, will amount to several thousand bales.

Over the entire Sea Island belt the crop had an unfavourable start, on account of cold, wet weather, and much cotton had to be replanted. For several weeks after planting, rains kept the fields grassy, but clear weather since May 20 has produced a decided change and, somewhat to our surprise, a large majority of the reports stated that fields were clean.

The quality of seed planted leaves much to be desired, and will probably affect unfavourably the length, strength, and regularity of the staple produced.

While seasonable weather may hasten the maturity of the fruit, the present outlook is that cotton will be late in moving freely to market, and that the crop will be exposed to the danger of an early frost.

The plant, while small, looks healthy, is branching near the ground, and has short thick joints, all of which are favourable features.

### COTTON PROSPECTS IN THE SEA ISLANDS.

The Sea Island Cotton Report of Messrs. Henry W. Frost & Co., of Charleston, dated June 15, 1907, contains the following note:—

The weather has been more favourable during the past week, resulting in better advices from the crop, which in some instances is reported to be doing well.

On June 22, they write:—

The weather has been favourable again during the past week, and consequently, the crop is generally reported to be making good progress, although still two to three weeks backward.

### COTTON PROSPECTS IN MONTSERRAT.

Cotton planters in Montserrat are anxiously looking for rain, as will be seen from the following communication, dated June 24 last, received by the Imperial Commissioner of Agriculture from Mr. W. Robson, Curator of the Montserrat Botanic Station:—

Owing to the prolonged drought very little planting of cotton has yet been done. The few acres planted in May have suffered severely, and in most cases will need to be replanted.

No planting has been done since June came in, and the situation is becoming rather serious.

At Grove Station the rainfall for June has been 0.86 inches, and I think this is about the average of the island.

Lands are all ready, and everyone will be busy as soon as rains come.

I have an ample supply of selected seeds for small planters, and have already sold off 600 lb. to two hundred different people.

### COTTON GROWING IN SPAIN.

Experiments in cotton growing have been carried out on irrigated lands in Spain with several varieties of cotton. The average cost of working the crop was £11 11*s.* per acre, this being equivalent to an average cost of production of 4½*d.* per lb. of cotton. Sea Island cotton, which was one of the varieties grown, gave 271 lb. of lint, valued at £12 6*s.*, and 856 lb. of seed, worth £1 8*s.*, thus showing a net profit of £2 3*s.* per acre.

The Government of Spain are very anxious to encourage the systematic cultivation of cotton in the country. The rainfall is somewhat deficient but there are thousands of acres along the banks of the Guadalquivir which could easily be irrigated, and which would then, it is estimated, yield a crop of 150,000 bales per annum.



## FLORIDA SEA ISLAND COTTON.

The following brief account of the cultivation of Sea Island cotton in Florida has been contributed by Mr. John Belling, B.Sc., who is now on a visit to that State. Cotton is chiefly grown in Florida during the summer season, from April to September, and thus the references to dates given in these notes have no bearing on the conditions existing in the West Indies, where there is no winter to interfere with the treatment of the crop:—

The medium long staple cotton known in the markets as Florida Sea Island is grown, chiefly, in certain adjoining counties in the middle north of that State, and to some extent in the adjacent counties of the State of Georgia.

The following statistics are taken from the biennial reports of the Commissioner of Agriculture of the State of Florida, for an opportunity of consulting which, the writer is indebted to the courtesy of Professor Blair, of the Florida Agricultural Experiment Station:—

SEA ISLAND COTTON IN FLORIDA, 1906.

	Acres.	Bales.	Value.
Madison county ...	34,201	7,569	\$461,595
Hamilton „ ...	33,977	8,840	\$435,240
Luwannee „ ...	31,877	6,109	\$483,140
Alachua „ ...	14,054	9,974	\$255,484
Bradford „ ...	10,423	4,123	\$236,580

It is evident that the yields of cotton, and the prices obtained, vary immensely in the different counties. In the counties of Marion, Baker, Lafayette, Taylor, Columbia, Levy, and Jefferson, there were cultivated, in 1905, areas varying from nearly 4,000 acres, in the case of Marion, to 1,800 acres for Jefferson. The total for the State of Florida in 1905 was 163,574 acres, producing 46,103 bales of Florida Sea Island cotton, valued at \$2,507,007. Thus, for the whole State, it requires, on an average, a little more than 3½ acres to produce 1 bale of Sea Island cotton, of an average value of a little less than \$54.50.

### PREPARATION OF LAND AND MANURING.

Cotton farms vary from 10 acres to 15 acres. Even the smallest grower likes to put in enough to make one bale, which under the poor cultivation usually given by the negro, requires perhaps 5 acres or more. In January, the old stalks are either burnt, or, which is better, they are cut into short pieces by means of an implement called a stalk-cutter, which is drawn by a pair of mules. In ploughing, these pieces of stalk are turned under. Chemical fertilizers are usually applied to the cotton land in Florida; Georgia State standard manure is most commonly used, but sometimes kainit alone is applied at the rate of 100 lb. to 150 lb. to the acre. Farmyard manure is, of course, used when it can be got, or a compost of swamp humus (called 'muck') is made.

### SOWING SEED.

Cotton seed may be planted up to May 1, but the best period is usually from March 24 to April 10, and this is done in furrows 4 feet apart. The seeds are usually obtained in bulk from the ginnery. The supply of seed was obtained originally from the Sea Islands. *In certain localities selected seed of Sea Island cotton has been obtained from the West Indies for trial during the season of 1907.* Some planters select the plants which bear most bolls, and save

their seed from these. Small seeds are said to give more lint to the acre than large seed.

The cotton seeds are usually planted from 1½ to 2 inches deep, and single seeds are put in fairly closely together by means of a 'seed planter.' If the seedlings are injured by frost or cut worms, the area is re-seeded. The seedlings are thinned with hoes to about 15 to 20 inches apart.

### CHARACTER OF SEEDLINGS.

It is a good sign if the young cotton plants begin to branch low down, and planters who are at pains to select their seed would choose plants with this character. The rows of young plants are cultivated and earthed up by a 2-horse cultivator, which straddles each row.

### INSECTS AND DISEASES.

The cotton worm does not appear to be very prevalent. Paris green is applied by means of bags, made of rather fine cloth, borne at the two ends of a pole carried by a horse along the middle of each alternate space. Sometimes flour or lime is mixed with the Paris green. About 3 lb. per acre of Paris green are needed for one application. The powder gun with a rotating fan and two spouts is liked where it has been tried.

Cotton stainers or 'red bugs' are not particularly prevalent. They have been known, however, to do considerable damage.

The young bolls of the cotton sometimes drop off before ripening, depending on the season. The boll worm is known in the State, but does not seem to cause much injury.

Fungus diseases may appear in wet weather, but do not seem to do noticeable damage.

### PICKING COTTON.

The picking of cotton may begin in the latter part of August, the time depending on the local supply of labour, as well as on the season, but it usually begins by September 1. There may be two or three pickings, according to the weather and the rate at which the bolls open, and there may be two weeks or more between each picking. The pickers are obliged to pick clean, or they are discharged. Men or women pick from 50 lb. to 75 lb. of seed-cotton a day, on the average; a very few may reach as high as 100 lb. Children may gather from 20 lb. to 25 lb. The rate of pay varies from \$1.00 to \$1.25 per 100 lb.

### SUNNING AND GINNING.

When rain falls in the picking season the damp cotton is sunned before being delivered to the gin. The cotton is very often ginned without any money payment, the seed being retained by the ginnery. The lint sells for from 18c. to 35c. per lb. Length and strength of staple are the principal factors in determining the price.

No selection is apparently practised for length of staple, as in the Sea Islands, nor are plants selected for strength of fibre, natural twist, or weak fibre. The only selection which was heard of is that mentioned above as being occasionally practised by some farmers, viz., for quantity of lint per acre.

### YIELD OF LINT PER ACRE.

The yield per acre may be from 350 lb. to 400 lb. of seed-cotton, of which about 30 per cent. is lint. The bales weigh from 350 lb. to 400 lb. They are pressed and sewn up in jute bagging, about 5 yards being needed for each bale. No iron bands are used. The Commissioner of Agriculture is formulating a plan for a uniform commercial bale of 500 lb. for all cottons throughout the United States, as the diversity of sizes of bales renders statistical information defective.



## EDITORIAL NOTICES.

Letters and matter for publication, as well as all specimens for naming, should be addressed to the Commissioner, Imperial Department of Agriculture, Barbados.

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# Agricultural News

VOL. VI. SATURDAY, JULY 13, 1907. No. 136.

## NOTES AND COMMENTS.

### Contents of Present Issue.

Particulars are given in the editorial of the very gratifying developments which have attended the rice-growing industry of British Guiana during the past seven years. It is hoped that the industry will continue to prosper, and that Trinidad and Jamaica may be encouraged to include rice growing among their minor industries.

Notes on the sugar industry in this issue, on p. 211, include a short article on the benefits derived from irrigation of the sugar-cane in Hawaii, and notes on recent developments in Porto Rico, and on the conditions prevailing in the sugar world of Mauritius.

On page 212, will be found an article on the growth of pine-apples in Jamaica, in which the writer strongly advocates the Red Spanish as a profitable variety for that island.

Under Cotton Notes, on page 215, will be found an interesting article dealing with the cultivation of Sea Island Cotton in Florida.

The curing of ginger is fully discussed in an article on page 221. This article was originally written with special reference to the conditions prevailing in Jamaica.

In view of the great interest at present taken by many in the West Indies in the production of citrate of lime, the particulars given in the article on p. 213 should prove of value to many readers.

### Feeding Waste Bananas to Cattle.

Mr. C. W. Meaden, of the Government Farm, Trinidad, recommends, as the best way of utilizing waste bananas, that they should be ground up, and fed to live stock. He has followed this course himself, obtaining, as he says, satisfactory results. The bananas are broken up in what is known as a 'root pulper,' and some cocoa-nut or cotton seed meal, together with a little molasses, is added to the crushed fruit, which addition—apart from its own feeding value—corrects the astringent properties of the green bananas. Mr. Meaden says that the mixture is used to the best advantage when fed to milking cows, growing stock, and working oxen, and all these animals consume it with relish. It is not so suitable for mules, or other stock; and if given to pigs or poultry should first be cooked. Stock owners in Jamaica too, have found this to be a good way of utilizing their waste bananas, and the practice has been followed in that island for many years.

### Natural and Synthetic Indigo Compared.

The results of a practical dye test, made with the object of comparing natural and synthetic indigo, are described by Mr. Cyril Bergtheil, in a report to the Bihar Planters' Association. The conditions were such as to be strictly comparable for the two materials as regards concentration of the dye bath, temperature, and fabric dyed. The results obtained, working on the large scale, and under practical conditions, were such as to uphold the opinion, often expressed by some practical dyers, that natural dye gives a certain richness of shade or bloom, invariably absent from goods dyed with synthetic indigo; for the natural indigo not only gave a richer shade, with the characteristic 'bloom', but also actually a darker shade. The difference between the natural and the synthetic material, which is hardly apparent in dyeing trials made on the small scale, appears to become of considerable importance under conditions such as occur in actual practice.

### Manufacture of Paper from Rice Straw.

The *Board of Trade Journal* for May 23 last, refers to a movement that is on foot in Texas, to manufacture paper from rice straw. Difficulty is being found in obtaining a sufficient supply of timber, suitable for the manufacture of pulp, with the result that the price of wood pulp, which was formerly from \$40 to \$50 a ton, has doubled during the past few years. Experiments have been made to test the suitability of straw for the manufacture of pulp, and success is stated to have attended these efforts. A company possessing a capital of several million dollars is intending to put on the market the machinery and process to convert the rice straw of the Louisiana-Texas rice belt into as fine pulp for paper making as that now produced from pulp timber. It is calculated that 2 tons of rice straw will produce a ton of pulp, of value \$40. The production of rice straw in Louisiana and Texas during 1906 is estimated at from 670,000 to 1,000,000 tons.



### Jamaica Bananas.

The English *Fruit, Flower, and Vegetable Journal* resents certain disparaging remarks which one or two other papers have been making about the Jamaica banana industry. The *Journal* rightly points out that the Jamaica banana is essentially the popular variety of that fruit in England, inasmuch as there are thousands of people who cannot afford to pay the price of the more expensive Canary product, and who—but for the cheap and plentiful imports from Jamaica—would be unable to purchase bananas at all. London takes a considerable quantity of Jamaica bananas, but this is not to be compared with the enormous supplies consumed in the Midlands and North of England, where this fruit is largely appreciated by the thousands of factory hands in the big manufacturing towns.

### Jamaica and Demerara Rums.

Mr. W. Collingwood Williams, speaking on the subject of Jamaica and Demerara rums before the Liverpool section of the Society of Chemical Industry, said that Demerara rums were much inferior in quality to most rums of the Jamaica type, and that they would be greatly improved in flavour, and much better adapted for the market, if the practice were adopted of blending them with 'flavoured' Jamaica rums. This at any rate would be a much better way of utilizing the Demerara product than that of sending it to Hamburgh, where it is used for flavouring potato or beet spirit, which afterwards illegitimately competes with Jamaica rum in its own market. Mr. Williams is of opinion that by the addition of suitable cultures to the unfermented wash, rums of different flavours could be produced almost at will, although, as yet, the attempts in this direction have not been so successful as was anticipated.

### Sugar Factories at Barbados.

A further step in the process of centralization in the business of sugar manufacture in Barbados has recently been made by the erection of a small central factory at Bulkeley.

The Barbados *Agricultural Reporter* of July 6, commenting on this, states that the planters in the neighbourhood who have taken advantage of their nearness to the factory are very satisfied with the results, which have demonstrated to them very forcibly that only in properly equipped factories can the greatest economy in manufacture be effected, and that the superior crushing power available gives a considerable increase in the percentage of sugar extracted from the cane. The planter too is able to devote all his energies to the business of cultivation, when he is freed from the responsibilities of manufacture.

It is not of course likely that the large factories of Cuba and Hawaii are suited to Barbados conditions, inasmuch as the estates in the latter island are small, and the number of proprietors large. Two or three factories in every parish however, would be sufficient to take the acreage of canes now cultivated, and such an extension of the central system would no doubt increase the net profit of the planters who patronised those factories.

### Bovine Consumption and Human Consumption.

The Royal Commission appointed by the British Government to report upon tuberculosis, and more especially as to the possibility of consumption being conveyed to human beings through the agency of the milk of cows affected with tuberculosis, have now published the result of their investigations in the form of a voluminous report.

This report states that the Commission feels itself justified in stating, as an undoubted fact, that human beings may contract consumption from the use of cows' milk infected with the bacillus of tuberculosis. To quote from the report: 'There can be no doubt but that in a great number of cases, the tuberculosis occurring in the human subject, especially in children, is the direct result of the introduction into the human body of the bacillus of bovine consumption; and there can also be no doubt that in the majority of these cases the bacillus is introduced through cows' milk. The facts indicate that a very considerable amount of disease and loss of life, especially among the young, must be attributed to the use of cows' milk containing tubercle bacilli.'

These conclusions, arrived at by the Commission after exhaustive enquiry, indicate the great importance of a supply of pure milk, especially for young children, and although cows in the West Indies rarely suffer from tuberculosis, yet the precaution of sterilising milk by boiling it just previous to use, is a very wise one.

### Camphor Production in Formosa.

The camphor exported from Formosa, though increased in value in 1906, shows a decrease in quality as compared with 1905.

Strenuous efforts are being made by the authorities to enable Formosa, as the chief camphor-producing country, to meet the world's growing demand for this commodity, and the Government is encouraging the laying out of plantations. In the districts from which the supplies have so far been drawn, the camphor trees are nearly exhausted, but vast forests still remain unexplored in the mountains.

An innovation, which should largely increase the production of camphor, is the process of extracting it from leaves and twigs, instead of from the trunks of the trees, as has been the case hitherto. The quality of the camphor obtained in this way is said to be in no way inferior to that produced from mature trees. It is estimated that 120 lb. of camphor can be obtained from 2½ acres of plantation after the fourth year of setting out the trees, and this quantity is doubled by the eighth year.

There is difficulty in finding a sufficient number of qualified workmen, as the process of distilling and manufacturing requires considerable skill and experience. Steps, are however, being taken to meet this difficulty, as well as to improve the stills, in order to further increase the output.

Since 1902 the price per 135 lb. of refined camphor in Formosa has risen from £9 to £12 5s. at the present time. The value in Europe is about double this figure.





## INSECT NOTES.

### Grasshoppers.

In an article entitled 'Crickets' which appeared in a recent number of the *Agricultural News* (Vol. VI, p. 106), it was mentioned that crickets belong to the same natural order as the grasshoppers, locusts, cockroaches, etc., all of which are included under the name Orthoptera.

There are two families of grasshoppers: those with short antennae, known as the short-horned grasshoppers or Acrididae, and those with antennae as long as, or longer than, the body, which are called the long-horned grasshoppers or Locustidae.

The short-horned grasshoppers are represented in the West Indies by the large grey grasshopper (*Schistocerca pallens*), which is found generally throughout the Lesser Antilles, and in Cuba, Hayti, and Jamaica, and by two species of a smaller size, one of which (*Orphulella punctata*) is found in Grenada, St. Vincent, St. Lucia, Dominica, Trinidad and in Central America, while the other (*Orphulella balloui*), is found in Barbados only.

The various plagues of locusts that have devastated agricultural regions from time to time, have been due to insects of the family of short-horned grasshoppers, such as the Rocky Mountain locust of the United States (*Caloptenus spretus*), the South African locust (*Pachytylus sulcicollis*), the Bombay locust (*Acridium succinctum*), and the African locust (*Schistocerca peregrinus*). The genus *Schistocerca* is entirely American, with the exception of the species *S. peregrinus*, which is found in Africa and Europe, and which may have been originally a New World insect that found its way to the Old World. The members of the genus in the Americas are well distributed, *Schistocerca americana* being found in the United States, *S. pallens* and *S. columbina* in the West Indies, and *S. paranensis* in Brazil.

The West Indian species (*Schistocerca pallens*) is of a greyish-brown colour, with light and dark longitudinal stripes. The female attains a length of about  $2\frac{3}{4}$  inches, and has a spread of wings of nearly 5 inches. It is to be found in pastures, grass fields and wild lands, where it breeds. Sugar-cane, cotton, and other crops are sometimes attacked, frequently resulting in a considerable amount of injury, as in the case of sugar-cane in St. Kitt's in certain years.

The smaller West Indian grasshoppers, belonging to the genus *Orphulella*, are much smaller, having a length of only about 1 inch. The colour ranges from a light green with brown markings to brown. The face is very oblique. The short-horned grasshoppers are represented in Trinidad by the locust (*Cyrtacanthracis* sp.) which is about 4 inches in length, with a spread of wings of nearly 8 inches. This insect is noticeable on account of the peculiar structure of the prothorax, which is raised to form a prominent longitudinal crest, of four lobes. The outer wings are dark-brown with honey-yellow veins, and the under wings are red with irregular black spots. It occurs as a pest at Cedros, where the young feed on the savannah grasses and low herbage, while the adults attack the leaves of the cocoa-nut trees.

The long-horned grasshoppers (Locustidae) are represented by a larger number of species in the West Indies than the Acrididae. In St. Vincent six species of short-horned grasshoppers are recorded, and nine species of the long-horned, and to this number the Grenada list adds two of the former and five of the latter. This family includes a number of insects that are remarkable either on account of their appearance, or of the sounds they produce. The most prominent characters, so far as appearance goes, are the extremely long and slender antennae, and the long, sword-shaped ovipositor of the females.

Two species of *Conocephalus* have a range including the entire West Indies, being found in most of the Lesser Antilles. They are slender insects, green in colour, and about 2 inches in length. Another member of this family occurs in Grenada and St. Vincent. This is the broad-winged katydid, (*Microcentrum pallidum*).

Another, (*Cyrtophyllus crepitans*) found in St. Vincent, has its outer wings broad, green, and veined like leaves. These bulge out in such a way as to give the insect a very bulky appearance, as if the body were made up of two green leaves laid loosely together. Two species of the genus *Bliastes* occur in St. Vincent and Grenada also. The Cric-crac of St. Lucia (*Xerophyllopteryx fumosa*), a large brown insect, is well known in that island by the sound it makes. The deliberate note of large numbers of this insect among the trees, is easily to be distinguished from all the other sounds and noises of the tropical night.

The use of the terms 'locust' and 'grasshopper' is attended with some confusion.—It is usual to speak of the grasshoppers in the more general sense, including under this name the members of both the families Acrididae and Locustidae. The locusts do not belong to the Locustidae, but to the Acrididae, as already mentioned. American entomologists, for the most part, designate as locusts all the short-horned grasshoppers (Acrididae), while British authors prefer to restrict the term, and use it only in reference to 'a species of grasshopper that occasionally increases greatly in number and that moves about in swarms to seek fresh food.' (Sharp, *Camb. Nat. Hist.*). These are the migratory locusts. Sharp also states that 'it is well established that locusts of the migratory species exist in countries without giving rise to swarms, or causing any serious injury.'

### JACARANDA MIMOSIFOLIA.

The following note, with reference to the flowering of this shrub, has been received from Mr. Thomas Jackson, Curator of the Botanic Station, Antigua:—

Some short time ago a shrub of this species flowered in the Public Cemetery, St. John's, Antigua. The plant is rather uncommon in Antigua, and with the exception of one or two small plants at the Botanic Station, it is the only specimen which I have seen here. It belongs to the Bignoniaceae.

The flowers are blue, and are borne in panicles; the leaves somewhat resemble in habit some of the Acacias. They are bipinnate, with many pairs of opposite pinnae. Each leaflet is slightly downy.

Owing to there being few shrubs in Antigua having flowers of this colour, the plant would prove useful if a colour scheme were considered in conjunction with the planting of shrubs.

This plant could be easily propagated either by seeds or cuttings. If cuttings are used, they should be obtained from the half-ripened wood, inserted in sand, and kept shaded until roots have formed.



## SCIENCE NOTES.

### Available and Unavailable Plant Food in the Soil.

The following particulars, which discuss very clearly the different conditions in which the mineral elements of plant food may exist in the soil, are abstracted from an article entitled 'The Fertility of some Colonial Soils' in the *Agricultural Journal for the Cape of Good Hope*, for April last:—

Certain chemical compounds are necessary to the normal growth and development of plants, and prominent among them are lime, potash, and phosphoric acid which are the three most important mineral constituents of the food of plants. The others are not so noteworthy as to need reference here. It is important and essential that the difference between 'plant food constituents' and 'plant food' should be understood and noted. Potash, for example, is a plant food *constituent*, no matter where it may be, or in what complex state of chemical combination it may exist; but it is not a plant food, except when present in the soil in the very condition in which the plant growing upon that soil can withdraw it just as it needs it, and turn it to its own account. Now, a chemical analysis of the soil to be of real value to the planter must give as a result, not the quantity of plant food *constituents*, but the proportion of plant *food* present, as the results of this latter analysis alone supply him with information that will enable him to devise the most economical system of manuring, if it is found that any of the elements of fertility are not present in sufficient quantity.

The chemist who wishes to ascertain exactly the composition of the soil, and the proportion in which each mineral element occurs, goes to work with strong mineral acids, for the purpose of bringing most of the compounds into solution, and, in dealing with the silicates and aluminates, it is necessary to go even further than this, before they can be properly estimated. As a result of such methods of treatment, the whole amount present of any one of the minerals we are considering—say potash—is reduced to the same state, as regards solubility, etc., and estimated as the total percentage of that mineral present in the soil, thus giving no means of deciding whether any part of it is present as plant *food*, and is immediately available for the purposes of the growing plant, or whether the whole must be classed as plant food *constituents* only. The same thing occurs with the phosphoric acid and the lime.

To be of any use to the plant, the mineral constituents of its food must be soluble in the water of the soil, or rather, in the very slightly acid cell sap of the roots. Until it is brought into solution it is perfectly useless to the plant, for no solid particle, however small, is able to pass through the cell walls of the root hairs, and into the system of the plant. There is free circulation between the sap in the cells of the root hairs, and the moisture of the soil in the immediate neighbourhood, by what is known as the process of osmosis through the permeable cell wall, and by this means the slightly acid cell sap is able to exercise a dissolving action upon the particles of plant food near at hand. The water present in the soil too, always contains a certain amount of carbon dioxide from decaying vegetable matter and other sources, and this imparts to it a greater dissolving power than pure water possesses.

It is the understanding of the above points that has enabled the chemist clearly to realize the difference between plant food *constituents* and plant *food*, and, by considering and applying this knowledge, he is now able to estimate very

approximately the proportion of plant food present in any soil. As we have seen, the measure of the plant food in any soil is the amount which is soluble in the sap of the root cells. Having learnt this fact, it lay with the agricultural chemist to estimate the dissolving power of this cell sap, and to prepare a chemical reagent approximating to it as nearly as possible in this respect. This has been done, and it is now considered that that amount of the mineral constituents of a soil, which is soluble in a 1-per-cent. solution of citric acid, represents fairly accurately the amount immediately available to a growing plant, and this *only* is the proportion which can properly be denominated as 'plant food.' The more inaccessible and unavailable (so far as the plant is concerned) plant food *constituents* exist in various degrees of insolubility in the soil, and form a reserve stock of fertilizing elements, which is constantly, but very slowly, breaking down, and changing into soluble and available plant food. This, however, in its turn, is being removed by plants at a greater rate than it is being replenished from the reserve stock, and hence the necessity of manuring, or of adding available plant food, to a soil upon which agricultural crops are grown, and from which they are removed every year.

### RUBBER AND HARDWOOD IN SPANISH HONDURAS.

The following note on the rubber and hardwood resources of Spanish Honduras is taken from the last *Annual Report* of the United States Consul at Ceiba:—

The planting of rubber trees is now attracting considerable interest all over the world. Few countries offer more attractive opportunities to the rubber planter than Honduras. The country between Truxillo and Nicaragua is particularly well adapted for rubber culture. There are many fine rubber trees in Honduras which have never been tapped on account of being located in inaccessible places. At present about 400,000 trees have been planted in this district, representing a capital of about \$1.00 United States currency per tree. Few of them are yet in a condition to be tapped. In a few years the exportation of cultivated rubber from this place ought to be of importance.

There are many million feet of various kinds of timber in Honduras, in forests yet untouched by the axe. Mahogany and cedar are very abundant in certain parts, as well as many other hardwoods, some of which no doubt would be valuable, but are not much used at present. Large tracts of pine are found in the interior. The pine here produces an excellent grade of turpentine, but very little has been done in this line up to the present time. The timber resources of Honduras cannot be developed until the country is better equipped with railroad transportation. The facilities for rafting are not good. Still, many concessions for cutting mahogany and other timber have been given, tramways are being constructed for getting it out of the forests, and the exportation of timber should show a great increase before long.

### TAX ON COSTA RICAN BANANAS.

It is stated that at a recent meeting of the Costa Rican Congress at San José, it was agreed that a tax of one cent per bunch be levied on bananas leaving the Republic. This departure, it is said, is to be taken as a means of raising sufficient funds to wipe out the large debt that hangs over the Republic.





## GLEANINGS.

It is said, in the June number of the *Chamber of Commerce Journal*, that veins of the richest coal have been discovered at a depth of 5 to 7 yards, at Tomé, in Chile.

The annual production of rubber from the Amazonas territory of Brazil has advanced from 17,500 tons in 1903, to 22,000 tons last year. (*Demerara Daily Chronicle*, June 21, 1907.)

The *International Sugar Journal* for June, states that Mr. Noel Deerr (author of 'Sugar and the Sugar-Cane') has just been appointed Assistant Director of Chemistry at the Experiment Station of the Hawaiian Sugar Planters' Association in Honolulu.

The French Vice-Consul at Para states that the total exports of cacao from Brazil during the year 1906 amounted to 4,733,638 lb., of which 2,843,739 lb. were sent to Europe, while America took the remaining 1,911,899 lb. Over three-fourths of the total was shipped from Para, chiefly during the months of July and August.

A syndicate has just been formed in London for exploiting Jamaica rum. The capital is announced at £100,000, and a certain number of the £1 shares have been allotted to local producers. The company proposes to control the output of Jamaica rum. (*Louisiana Planter*, May 25, 1907.)

The Maryland Experiment Station, after testing formalin for calf scour, announces that it has found one part of formalin in 4,000 parts of milk, will almost invariably destroy the organisms existing in the bowels of the calf, which are responsible for scour. Dissolve  $\frac{1}{2}$  oz. of formalin in  $15\frac{1}{2}$  oz. of water, and add a teaspoonful of this liquid to each pound of milk fed to the calf.

Alfalfa is a crop upon which the American farmer sets enormous value, and it flourishes in all parts of the country, being able to withstand both the heat of the Southern summer, and the very severe frosts of the Northern States in the winter. Each year sees an increasing acreage of the crop all through the Western States, and great quantities of it are now being converted into alfalfa meal, which, mixed with molasses, is a common cattle food.

Mr. T. B. Wood, University reader in agricultural chemistry, has been appointed Professor of Agriculture in the University of Cambridge, in succession to Professor Middleton, who has accepted an Assistant-Secretaryship at the Board of Agriculture and Fisheries. Mr. Wood is the author of many scientific and practical papers on agriculture, and he is co-editor of the *Journal of Agricultural Science*. (*Nature*, June 6, 1907.)

Up to Monday 3,559,437 lb. of colony rice had been exported from Demerara since the beginning of the year, in comparison with 370,739 lb., the figures for the corresponding period last year. Recently the schooner 'Mary L. Hassel' took away to Guadeloupe a shipment of 932 bags of rice, while on Saturday morning the 'Majestic' sailed for Barbados with 200 bags, and on Sunday the 'Lettie M. Hardy' left with 250 bags. (*Weekly Argosy*, June 22, 1907.)

Attracted by the reported success of the growth of sisal for hemp production in other tropical countries, the Government of the United States have determined to introduce some 100,000 plants into Porto Rico in order to attempt its cultivation on a commercial basis. There is not the slightest apparent reason why it should not thrive in this island as well as in other similar climatic places, and, by suitable husbandry, render valuable much land which at present is considered valueless for the production of any sort of crop. (*British Consular Report*, 1906.)

The exports of teak from Siam and Java are rapidly growing in importance, and the increased supply on the market has caused a considerable fall in the prices of Burma teak. Java now stands at the head of teak-exporting countries, although experts do not believe that the timber is as good as that produced in Burma. The exports of Burma teak were estimated in 1906 at 86,500 tons, while in 1905 the figures were very slightly over 80,000 tons. (*Chamber of Commerce Journal*, June, 1907.)

At the Maitland (New South Wales) Agricultural Show some healthy, well-grown samples of cotton, of Russell's big boll variety, were shown. This indicates the great range of country over which cotton may be raised in Australia. In fact it may be cultivated farther south than Sydney, west as far as Bourke, and right through Queensland. Before long this crop—so it is anticipated—will be one of the most important in the Commonwealth. (*Textile Mercury*, June 1, 1907.)

The *American Nut Journal* remarks that while the peanut (*Arachis hypogaea*), more commonly known in the West Indies as the ground-nut, is very popular as an article of food, very few people know how really nutritious it is. Analysis has proved it to contain three times the percentage of nutriment that beef possesses, and since its value has become better known, it has been served up in the form of peanut butter, salted peanuts, soups, cakes, etc. Many vegetarians use peanut butter only, prepared from the roasted nut.

The *Sugar Planters' Journal* of June 8 last, quoting from *El Economista*, of Havana, draws attention to the excellent results obtained by a planter in Cuba, from irrigation of the sugar-cane plantations on his estate in that island. These results call for special attention just now, when Cuba is suffering so much from drought, which most of the planters are unable to mitigate in the slightest. The sun and soil of Cuba will do their share in producing any crop that demands fertility and heat; what is often wanting is a plentiful and unvarying supply of water, and man's ingenuity can provide this. When once it is provided, Cuba will be able to raise crops in variety and quantity sufficient to make her economically independent.



## THE CURING OF GINGER.

Below is given an extract from a paper, originally read before the Lamb's River Branch of the Jamaica Agricultural Society, by Mr. C. A. Barret, and reprinted in the *Journal of the Jamaica Agricultural Society*, for July, 1903:—

'How can we prepare our products for market so as to secure the best price?' is a question that should be carefully considered in all countries where agriculture is practised, and an attempt to answer this question as regards Jamaican ginger, will involve the consideration of many details.

The low prices obtained for Jamaica ginger are in part due to careless preparation, and the want of a regular and conscientious system of grading. That the soil of Jamaica is capable of bringing forth products of a very high order, when carefully handled, there is no question. It is said that ginger from Jamaica is of better quality than Cochin ginger, yet the latter secures a better price in the English market.

To prepare ginger for shipment requires a great deal of work and care. After the rhizomes have been dug out of the earth, and freed from roots and dirt, the skin is to be carefully and thoroughly taken off with a knife made for the purpose. The points and toes must be carefully rounded, the smaller toes cut off in such a way as to disguise the mark, thus giving the pieces a graceful, rounded appearance. These must be washed very clean and laid regularly, piece by piece, on mats made for the purpose, and put in the sun to dry. These mats may be made of strips from the stems of the bamboo, put together in such a way as to form a sort of network; or from thatch-bone, the stalks of large ferns, or cutting-grass, dried in the sun. The system of drying ginger on mats has a decided advantage over the board and zinc practice, which is so common in Jamaica. With the former method, the air passes freely between the pieces, and the water drains off easily and quickly when put in the sun. At noon of the first day the pieces are to be turned over, as regularly as they are laid on the mat at early morning, so that both sides get an equal amount of the sun's heat on the first day. When evening comes they can be rumped up in an irregular manner, and left in the open air for the night. On the evening of the next day the mat with the ginger is to be taken up, but it should not be folded. The ginger must be left free to the air, or it will sweat, be of a reddish colour, and gummy, in which state dirt readily adheres to it. When once ginger has been put in the sun to dry, it must never be allowed to get wet again, or it will swell. Ginger will take three or five days to be perfectly dry.

There are three sorts of ginger—turmeric, yellow, and blue. The last two are about the same in nature, but the turmeric is somewhat smaller, it bears with more toes, shrinks less in drying and, with good care, hardly ever gets spoilt, even in bad weather. Ginger that has remained in the earth for two years, will dry very much whiter, and will contain more flour than ginger got from rhizomes planted the year before. If therefore the price for one year is low, and ginger does not pay to peel, there will, with care, be a decided gain the next year, instead of a loss, especially if the price goes up, as the quality will then be so much better. After the entire crop of ginger has been dried, then comes the washing or 'juicing day' as it is sometimes called. The dry ginger is soaked for about half an hour in clean water to which some lime juice ( $\frac{1}{2}$  pint to about 6 or 7 gallons of water) has been added. After that, it is washed in the same water, and laid on mats to dry. The difference between the washed and unwashed ginger is very apparent. The former will be much whiter and more floury.

## VISIT OF CANADIAN DELEGATION.

The following letter from the Under-Secretary of State for the Colonies has been received by the Imperial Commissioner of Agriculture, on the subject of the visit of the representatives of the Canadian Boards of Trade to the West Indies in February and March last (*Agricultural News*, Vol. VI, pp. 1, 40, 63, 94, 132, 164.)

*The Under-Secretary of State for the Colonies—to the Imperial Commissioner of Agriculture.*

Downing Street,  
June 1, 1907.

Sir,—I am directed by the Earl of Elgin to acknowledge the receipt of your letter of the 2nd April, enclosing reports of the visit paid to the West Indies by the representatives of the Boards of Trade in Canada.

Lord Elgin has read these reports with interest, and directs me to inform you that he approves of your action in connexion with the visit of the delegates, and appreciates your successful efforts in the matter. He hopes that this visit will result in an improvement of trade relations between Canada and the British West Indian Colonies.

I am, etc.,

(Sgd.) C. P. LUCAS.

## CANADIAN EXHIBITIONS.

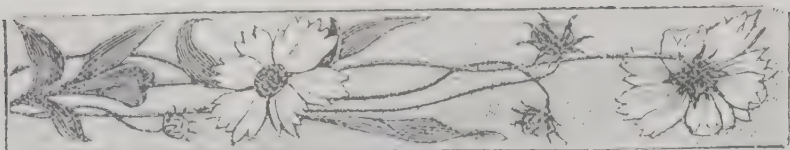
The following extract is taken from a letter dated June 17, 1907, received by the Imperial Commissioner of Agriculture from Mr. J. D. Allan, of Toronto, the senior member of the recent Canadian Delegation to the West Indies. The references to the exhibits proposed to be forwarded from these colonies to the Toronto National Exhibition are of special interest:—

Immediately on my return I asked Dr. Orr, the Manager of the Exhibition, to see that a specially prominent position was accorded the West Indian Exhibit. Your letter to the Secretary of our Board gave me the opportunity to again refer to the matter at a meeting of Council, and I have received the assurance that one of the best positions has been allotted, and that the influence of the Council of the Board of Trade, as well as its active assistance, will be at your service in any way in which you may find it advantageous. I have the assurance of the President that he will esteem it a pleasure to have you make use of the Board in any way.

I thank you for your kind opinion of the report of the Delegation; the presentation of it was a unique occasion honoured by the Lieutenant-Governor of Ontario with his presence, and by that of the leaders in finance and commerce. I was able to offer some remarks before presenting the report that have resulted in an interest being created which may have a beneficial effect as regards the future relations of Canada with the West Indies. In connexion with the Board we have formed a West Indian Committee.

I think one result of our mission will be seen in the active interest in the West Indian exhibit that will be evinced on the part of visitors to the Exhibition, and any methods you can adopt to further arouse and attract, as well as educate the people will be worth your serious consideration. May I suggest that you have in attendance some one who can intelligently and pleasingly describe the exhibits.





## MANURIAL EXPERIMENTS WITH TOBACCO.

The following particulars of manurial experiments with tobacco at Dumbara (Ceylon) are taken from an article in the May number of the *Tropical Agriculturist*:—

The only system of manuring which has yet been practised at Dumbara in regard to the tobacco crop is by tethering cattle on the land for some months previous to tillage operations, and incorporating their manure into the soil before transplanting takes place. The cultivators, however, are not satisfied with cattle manure, as certain diseases are, rightly or wrongly, attributed to it, and certainly the pests and diseases common to exhausted soil have been present in the last two or three crops. With a view therefore of ascertaining the effect of artificials on the tobacco plant, the experiments described herewith were recently carried out.

For the purpose of the trials three plots, each of  $\frac{1}{2}$  acre, were taken. The first plot was left unmanured, the second was dressed with cattle manure in the usual way, by tethering cattle on it previous to tilling; while to the third plot was added the following mixture:—

- 160 lb. Best white castor cake.
- 40 „ Nitrate of potash.
- 40 „ „ „ soda.
- 10 „ Freudenberg's Patent Manure, No. 1.
- 60 „ Superphosphate.
- 60 „ Slaked lime

The transplanting from the nursery, which is usually done in April, was last year (the season in question) deferred until May, on account of the unprecedented drought. The artificial manure, however, did not arrive from the merchants until June, when the plants on the plot dressed with cattle manure had already made a good start, and outgrown those on the other two plots. Rain came in the first week of July, and the mixture of artificials, which had been kept over, was then applied, by sprinkling about 2 oz. of it round each plant, an inch away from the root, and mixing it with the soil and covering it with fresh soil. In this way the manure was applied to the 3,000 plants on the  $\frac{1}{2}$  acre plot. The effect in a few days was magical, as the plants, helped by a shower of rain, soon afterwards began to grow steadily, and by the first week of August they were of the same height as those on the plot dressed with cattle manure. Unfortunately, late in July, most of the plants on the plots manured with artificials suffered from an attack by the stem borer, which undoubtedly very much depreciated the results obtained from this plot. Those on the cattle manure plot were not attacked, this being attributed to the fact, that owing to their early start, they had outgrown the stage at which the pest usually manifests itself.

Although the plot dressed with cattle manure enjoyed immunity from the stem borer, there were quite a number of the plants on it attacked with diseases called 'Kara' (white leaves), 'Suruttal' (curled leaves), and 'Paluppu' (sudden and premature ripening), as compared with those on the other plot. The chief difference in the two manured plots was that while the growth and size of the plants on the plot fertilized with artificial manure were uniform throughout, there was not much uniformity on the other plot, on which patches of high and vigorous plants were interspersed with those of inferior growth and size. This would most probably be

accounted for by a corresponding want of uniformity in the distribution of the cattle manure.

The crop returns obtained from the three separate plots are set out below:—

	No. of Plants.	No. of Leaves.	Average.
Artificial manure	2,100	25,000	11.90
Cattle manure...	2,800	32,700	11.68
Unmanured ...	1,900	16,000	8.74

It is much to be regretted that, on account of the paucity of the leaves, those on the three plots could not have been separately cured, and the difference in their market value separately ascertained.

The experiment however has been instructive on several points. A mere glance at the figures will indicate that the growth of the tobacco crop had in the past been retarded for want of plant food. The early and rapid growth of the plants on the plot dressed with cattle manure demonstrates that fertilizing agents should be well incorporated into the soil before transplanting takes place, while the erratic growth on the one plot, and the more uniform growth on the other, shows that artificial manure is preferable to the old system of tethering cattle, for the purpose of ensuring uniformity of growth, which is so advantageous in facilitating and simplifying the gathering of the crop.

## IMMIGRATION INTO HAWAII.

The first *Report* of the Board of Immigration of Hawaii, given in the *Hawaiian Planters' Monthly* for February, shows what efforts are being made to meet the demands for labourers:—

The only immigration since the annexation of the islands to the United States has been of Japanese, and now there is a very preponderating element of Japanese labourers on the sugar plantations.

The sugar industry of Hawaii is the predominating influence, and the various immigration schemes carried on in the past have been, and, to a large extent must, in the future, be conducted with the idea of supplying labourers to work on the plantations. Under the present plantation system it has been found possible by many planters who own their lands to allow the labourers the use of ravine sides, and bottom lands, and a general common for pasture. Planters who are able and willing to give these advantages find it comparatively easy to retain all such labourers on their plantations.

Much of the present sugar land of Hawaii has been made productive at an enormous expense and great risk by those who have undertaken its development and, therefore, many of the planters resent any proposition that involves any breaking up of their plantations, or any parting with land that has been developed. The Board of Immigration, in attempting to domicile immigrant labour has, however, been liberally supported by the sugar interests of the territory of Hawaii, and an effort is being made to promote a settlement of labourers in Hawaii, especially from the Azores, Madeira, and Southern Europe.

In 1906, shipments of Portuguese and Spanish immigrants were made, and it is believed to be a satisfactory beginning toward securing a resident labouring population. The expense has so far been entirely paid by donation from the Hawaiian sugar planters. Houses have been erected, and the land given to the immigrants has been of the best, with the result that it would appear that the labourers are well provided for, and it is suggested that the entire burden of the Board of Immigration should not be upon the sugar industry, but might, now that the undertaking has made a successful beginning, be recognized by the Legislature.



## WEST INDIAN PRODUCTS.

### Drugs and Spices in the London Market.

The following report on the London drug and spice market for the month of May, 1907, has been received from Mr. J. R. Jackson, A.L.S.:—

The drug and spice market during May has remained quite of an uninteresting character. The chief items of interest have been camphor and Jamaica ginger, both of which continue to demand much attention and unusually high prices. In the case of camphor some serious fears begin to be aroused whether, in the near future, the synthetic article will not affect, or even displace, the natural product. With regard to Jamaica ginger, the explanation of its increased value was stated, at the beginning of the month, to be due to the shortage of the supplies, which were not sufficient to meet the increasing demand; besides which, it was stated that reports from Jamaica indicated that the crop, which was harvested very early, owing to the continuation of dry weather, was below the average. The following are the details for the month:—

#### GINGER.

At the spice auction on May 1, Jamaica ginger met with a good competition, at prices of from 3s. to 5s. per cwt. over previous rates; fair to good bright fetching 87s. 6d. to 93s. 6d.; low middling to middling, 80s. to 85s.; ordinary to good ordinary, 73s. 6d. to 79s. 6d.; and common dark, 62s. 6d. to 71s. 6d. At these rates some 320 packages were disposed of out of 500 offered. At the same sale there was but little demand for Cochin and Calicut; good small cut fetched from 47s. 6d. to 48s.; white unassorted native cut was bought in at 62s. 6d. to 65s.; small rough washed Cochin at 35s.; and brown rough Calicut at 38s. A week later, there was a further advance in the price of Jamaica. Altogether 900 packages were offered, of which 544 were sold; good bold at from 91s. to 97s.; low middling to middling, 83s. to 90s.; common to good common, 74s. to 80s.; and ordinary dark, 72s. to 73s. 6d., ratoon fetching 68s. 6d. Three hundred and thirty-seven bags of Cochin and Calicut were offered, and 237 were disposed of, realizing the following prices: slightly wormy, 41s., and very wormy, hard, dull Cochin 32s. 6d. Good limes Japan, of which 100 bags were offered, was bought in at 29s. A week later, namely, on the 15th., slightly lower rates prevailed, good to fine fetching 90s. to 96s.; fair washed, 84s. to 93s.; small, 82s.; common to good common, 75s. to 80s.; and ratoon, 70s. Five hundred and thirty packages were offered, and 400 were disposed of. The offerings of Cochin and Calicut at this sale were unimportant. No auctions were held in Whitsun week; but, on the 29th., the very large number of 1,100 packages of Jamaica ginger were put up at auction, and 250 were disposed of at steady rates, fair bright washed fetching 90s.; ordinary to good ordinary, 75s. to 82s.; and common dark, 72s. to 72s. 6d. About 1,600 packages of Cochin and Calicut were also offered at this sale, 50 packages only finding buyers at 32s. for very wormy rough Calicut; good, bright, bold Calicut was bought in at 50s.

#### MACE, NUTMEGS, AND PIMENTO.

Throughout the greater part of the month, mace and nutmegs held quite an unimportant position, realizing steady rates. At the auction on the 29th., however, some 100 packages of West Indian mace were offered, sales being effected at the following rates: good, 1s. 8d. to 1s. 9d.; fair, 1s. 6d. to 1s. 7d.; and ordinary, 1s. 4d. to 1s. 5d. Bold red Penang fetched at this sale 1s. 9d. Four hundred

and sixty packages of West Indian nutmegs were also offered, and about 300 sold at steady rates for medium sizes, the larger sizes being easier. Pimento at the first auction in the month was bought in at 2 $\frac{3}{4}$ d., 100 bags of fair quality being offered. A week later 18 bags of ordinary mixed blacks were disposed of at 2 $\frac{5}{8}$ d., and on the 29th., some 200 bags were offered, a few of which sold at 2 $\frac{3}{4}$ d.

#### ARROWROOT.

Of this article, there is little or nothing to report. At the second spice sale, 180 barrels of St. Vincent were offered, and all were bought in at 2 $\frac{3}{4}$ d. to 3 $\frac{1}{4}$ d. per lb.: 4d. was the price quoted for Natal in cases. No further change took place during the month.

#### SARSAPARILLA.

At the drug auction on the 9th. of May, 32 packages of native Jamaica were offered and 30 sold at 1s. 4d. to 1s. 7d. per lb. for ordinary mixed yellow, and pale red to good red, and 1s. 6d. for fair red and yellow mixed. A small quantity of Honduras roll sold for 2s. 6d. per lb. On the 23rd., it was announced that 16 bales of grey Jamaica, 25 bales of native Jamaica, and 9 bales of Lima-Jamaica had arrived at the warehouse, and that a small quantity of grey Jamaica was obtainable at 2s. 7d. per lb.; and on the 30th., it was reported that a further consignment of 12 bales of grey Jamaica was also close at hand.

#### KOLA, LIME JUICE, OIL OF LIME, TAMARINDS, ETC.

At the first auction, 6 bags West Indian Kola nuts were sold at 4d. per lb., and at Liverpool, sales of African had been made at 2 $\frac{1}{4}$ d. to 2 $\frac{1}{2}$ d. per lb. Concentrated West Indian lime juice was quoted at the beginning of the month at £25, and for genuine West Indian distilled oil of lime, which is stated to be somewhat difficult to obtain, 3s. 4d. would readily be paid. Antigua tamarinds to the extent of 45 barrels were offered and bought in at 16s. It was said at the first auction that the new crop from the West Indies is coming forward so slowly that holders are firm at 20s. for Barbados in bond. Fair Bombay cashew nuts were offered during the month and sold at 45s. per cwt. Four cases of West Indian papaw juice were also submitted and a bid of 5s. per lb. was made. For 5 cases of West Indian distilled oil of orange, 5s. 8d. to 7s. per lb. was obtained, and 2 bottles of grape fruit oil realized 1s. 6d. Quillaja bark has been quoted at advanced prices in Liverpool, £24 per ton being asked. Chillies, for which there is still a good demand, have been realizing, for fair large red and yellowish Japanese, 19s. to 20s.; mixed Mombasa and Zanzibar, 17s. 6d. to 20s.; and Sierra Leone, as much as 28s. 6d. per cwt.

### EXPORTS OF BROOM CORN FROM THE WEST INDIES.

Small shipments of broom corn from the West Indies to Canada have been made on several occasions within the past year, and Mr. J. Russell Murray, in a report published in the *Agricultural News*, Vol. V, p. 143, described the early samples as leaving little to be desired in size, quality or colour. In a subsequent letter dated June 13 last, Mr. Murray writes:—

The last shipments of broom corn were fairly satisfactory, and I look forward to the West India product being quite a factor in the industry.



## MARKET REPORTS.

London,—June 25, 1907.—'THE WEST INDIA COMMITTEE CIRCULAR,' Messrs. KEARTON, PIPER & Co.; Messrs. E. A. DE PASS & Co., June 14, 1907; 'THE LIVERPOOL COTTON ASSOCIATION WEEKLY CIRCULAR,' June 21, 1907.

ARROWROOT—St. Vincent,  $2\frac{1}{3}d.$  per lb.  
 BALATA—Sheet,  $2/3$  to  $2/7$ ; block,  $1/10$  to  $1/10\frac{1}{2}$  per lb.  
 BEES'-WAX—£8 2s. 6d. to £8 12s. 6d. per cwt.  
 CACAO—Trinidad,  $95\frac{1}{4}$  to  $98/-$  per cwt.; Grenada,  $84/-$  to  $91/-$  per cwt.  
 CHILLIES—Japanese, fair large red and yellowish,  $19/-$  to  $20/-$ ; Zanzibar and Mombasa mixed,  $17/6$  to  $20/-$ ; Sierra Leone,  $28/6$  per cwt.  
 COFFEE—Jamaica, ordinary to good ordinary,  $35/-$  to  $40/6$ ; fine ordinary to low middling,  $44/-$  to  $49/6$ ; middling greyish,  $52/-$  to  $53/6$ ; bold,  $54/-$  to  $59/-$ ; Santos,  $27/-$  per cwt.  
 COPRA—West Indian, £23 10s. to £24 c.i.f., per ton.  
 COTTON—West Indian, good medium,  $7/65d.$ ; West Indian Sea Island, good medium,  $19d.$ ; medium fine,  $20d.$ ; fine,  $21d.$  per lb.  
 FRUIT—  
 BANANAS—Jamaica,  $5/6$  to  $7/6$  per bunch.  
 PINE-APPLES—St. Michael,  $1/-$  to  $3/6$  each.  
 GRAPE FRUIT,  $15/-$  to  $23/-$  per box.  
 ORANGES—Jamaica,  $8/-$  to  $13/-$  per box.  
 FUSTIC—£4 5s. to £4 15s. per ton.  
 GINGER—Jamaica, good medium to bold,  $90/-$  to  $96/-$ ; low middling,  $84/-$  to  $90/-$ ; ordinary to good ordinary,  $75/-$  to  $82/-$ ; ratoon,  $70/-$  per cwt.  
 HONEY—Dark to good pale,  $17/-$  to  $24/-$ ; fine white set,  $26/-$  to  $28/-$  per cwt.  
 ISINGLASS—West Indian lump,  $1/7$  to  $1/10$  per lb.  
 LIME JUICE—Raw,  $1/2$  to  $1/5$  per gallon; concentrated, £25 10s. per cask of 108 gallons; Distilled Oil,  $3/1$  per lb.; hand pressed,  $4/6$  per lb.  
 LOGWOOD—£4 5s. to £4 15s.; roots, £3 5s. to £4 5s. per ton.  
 MACE—West Indian ordinary red,  $1/3$ ; fair red,  $1/4$ ; fair mixed,  $1/5$ ; pale  $1/6$  to  $1/7$ ; broken,  $1/1$  to  $1/3$  per lb.  
 NUTMEGS—138's to 120's,  $5\frac{1}{4}d.$  to  $5\frac{3}{4}d.$ ; 118's to 112's,  $5\frac{1}{2}d.$  to  $6d.$ ; 110's to 106's,  $6d.$  to  $6\frac{1}{2}d.$ ; 100's to 90's,  $6\frac{1}{2}d.$  to  $7\frac{1}{2}d.$ ; 82's to 78's,  $8\frac{1}{2}d.$ ; 75's to 90's,  $9d.$  to  $9\frac{1}{2}d.$ ; 60's,  $1s. 8d.$ ; 58's,  $1s. 9d.$  per lb.  
 PIMENTO—Fair,  $2\frac{3}{4}d.$  per lb.  
 RUM—Jamaica, common  $2/7$ ; good to fine,  $3/-$  to  $8/-$ ; Demerara,  $1/0\frac{1}{2}$  to  $1/2\frac{1}{2}$  per proof gallon.  
 SUGAR—Crystals,  $16/6$  to  $18/6$ ; Muscovado, Barbados,  $14/9$  to  $15/6$ ; grocery,  $16/-$ ; Molasses,  $15/-$  to  $16/-$  per cwt.

New York,—June 28, 1907.—Messrs. GILLESPIE BROS. & Co.

CACAO—Caracas,  $18\frac{3}{4}c.$  to  $20c.$ ; Grenada,  $19c.$  to  $19\frac{1}{4}c.$ ; Trinidad,  $19\frac{1}{2}c.$  to  $20c.$ ; Jamaica,  $17\frac{1}{2}c.$  to  $18\frac{3}{4}c.$ ; Dominica,  $18c.$  to  $18\frac{1}{2}c.$  per lb.  
 COCOA-NUTS—Jamaica, \$20.00 to \$32.00; Trinidad, \$29.00 to \$30.00 per M.  
 COFFEE—Jamaica ordinary,  $8c.$  to  $8\frac{1}{4}c.$ ; fair to good ordinary,  $8\frac{1}{2}c.$  to  $9c.$ ; good washed,  $10\frac{1}{2}c.$  to  $11c.$ ; Rio No. 7,  $6\frac{3}{4}c.$  per lb.  
 GINGER—Small to bold dark root,  $15c.$  to  $15\frac{1}{2}c.$ ; small to bold bright,  $15\frac{3}{4}c.$  to  $16\frac{1}{4}c.$  per lb.  
 GOAT SKINS—Jamaica, Antigua, and Barbados,  $55c.$ ; St. Kitt's, St. Thomas, and St. Croix, dry flint,  $53c.$  to  $55c.$ ; heavy dry salted,  $41c.$  to  $43c.$  per lb.  
 GRAPE FRUIT—Jamaicas, \$5.00 to \$8.00 per barrel.  
 LIMES—\$5.50 to \$7.00 per barrel.  
 MACE— $35c.$  to  $40c.$  per lb.  
 NUTMEGS—75's to 80's,  $15c.$ ; 80's to 85's,  $13c.$ ; 90's to 100's,  $11c.$ ; 105's to 110's,  $10\frac{1}{2}c.$ ; broken,  $7c.$  per lb.  
 ORANGES—Jamaica, \$4.00 to \$5.00 per barrel.  
 PIMENTO— $5\frac{1}{2}c.$  per lb.

SUGAR—Centrifugals,  $96^\circ$ ,  $3.87c.$  to  $3.92c.$ ; Muscovados,  $89^\circ$ ,  $3.37c.$  to  $3.42c.$ ; Molasses,  $89^\circ$ ,  $3.12c.$  to  $3.17c.$  per lb., duty paid.

## INTER-COLONIAL MARKETS.

Barbados,—July 8, 1907.—Messrs. T. S. GARRAWAY & Co., and Messrs. JAMES A. LYNCH & Co., July 9.

ARROWROOT—St. Vincent, \$4.25 to \$4.75 per 100 lb.  
 CACAO—Dominica, \$17.00 per 100 lb.  
 COCOA-NUTS—\$14.00 to \$18.00 per M. for husked nuts.  
 COFFEE—\$10.00 to \$10.50 per 100 lb.  
 HAY—\$1.50 to \$1.80 per 100 lb.  
 MANURES—Nitrate of soda, \$62.00 to \$65.00; Ohlendorff's dissolved guano, \$55.00; Cotton manure, \$42.00; Cacao manure, \$42.00 and \$48.00; Sulphate of ammonia, \$72.00 to \$75.00; Sulphate of potash, \$67.00 per ton.  
 MOLASSES—14c. to 15c. per gallon.  
 ONIONS—Strings, \$6.00 per 100 lb.  
 POTATOS, ENGLISH—\$3.70; Canadian, \$2.40 to \$2.75 per 160 lb.  
 PEAS—Split, \$5.75 to \$5.90; Canada, \$3.10 per bag.  
 RICE—Demerara, \$5.90 to \$6.10 (180 lb.); Ballam, \$6.50 to \$6.60 per bag (190 lb.); Patna, \$3.75 to \$3.90; Rangoon, \$3.00 per 100 lb.  
 SUGAR—Dark crystals, \$2.00; Muscovado, \$1.75 per 100 lb.  
 SYRUP— $17\frac{1}{2}c.$  per gallon.

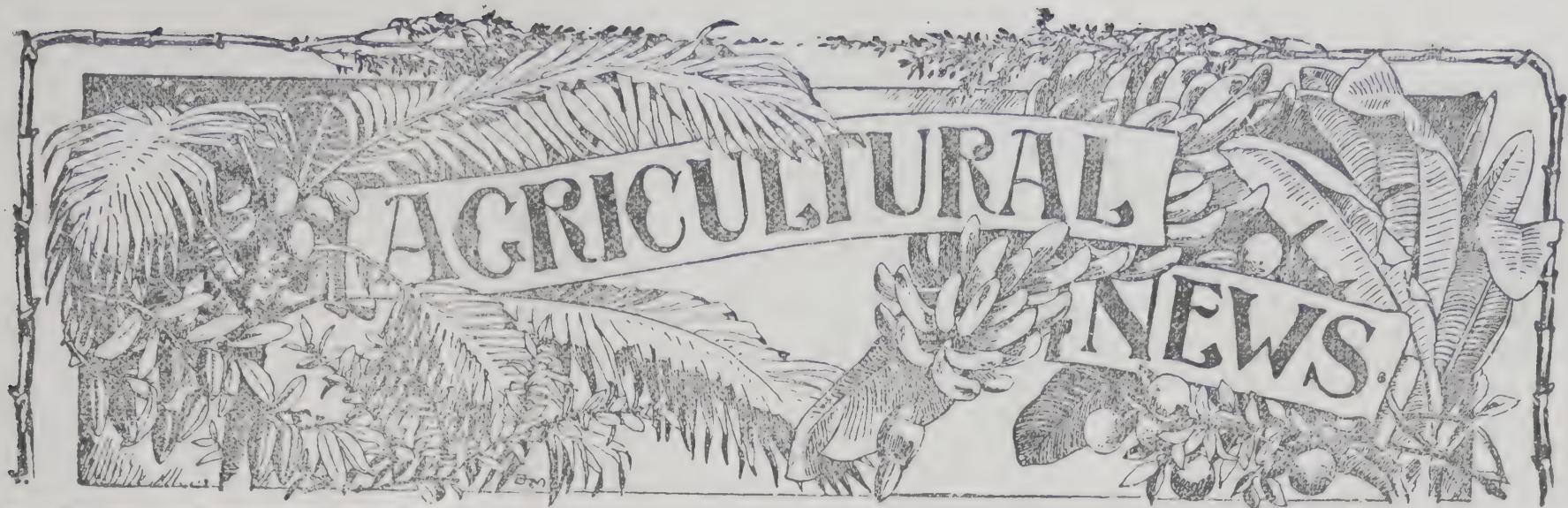
British Guiana,—July 6, 1907.—Messrs. WIETING & RICHTER.

ARROWROOT—St. Vincent, \$10.00 per barrel.  
 BALATA—Venezuela block, 32c.; Demerara sheet, 48c. per lb.  
 CACAO—Native, 17c. to 18c. per lb.  
 CASSAVA—No stock.  
 CASSAVA STARCH—\$8.00 per barrel.  
 COCOA-NUTS—\$12.00 to \$16.00 per M.  
 COFFEE—Creole, 14c. to 15c.; Jamaica,  $13\frac{1}{2}c.$  per lb.  
 DHAL—\$5.50 per bag of 168 lb.  
 EDDOS—\$1.20 to \$1.56 per barrel.  
 MOLASSES—16c. per gallon.  
 ONIONS—Tenerife, 4c. to  $4\frac{1}{2}c.$  per lb.  
 PLANTAINS—20c. to 48c. per bunch.  
 POTATOS, ENGLISH—Nova Scotia, \$5.00 per barrel.  
 POTATOS, SWEET—Barbados, \$2.00; Creole, \$1.32 to \$1.44 per bag.  
 RICE—Ballam, \$6.50 per 177 lb.; Creole, \$5.50 per bag (ex store); Seeta, \$5.50 to \$6.00; per bag.  
 SPLIT PEAS—\$5.90 per bag (210 lb.).  
 TANNIAS—\$2.16 per bag.  
 YAMS—White, \$3.00; Buck, \$3.00 per bag.  
 SUGAR—Dark crystals, \$2.50 to \$2.55; Yellow, \$2.90 to \$3.10; White, \$3.60 to \$4.00; Molasses, \$2.00 to \$2.20 per 100 lb. (retail).  
 TIMBER—Greenheart, 32c. to 55c. per cubic foot.  
 WALLABA SHINGLES—\$3.50 to \$5.50 per M.

Trinidad,—July 6, 1907.—Messrs. GORDON, GRANT & Co.

CACAO—\$19.00 to \$19.50; (110 lb.); Venezuelan, \$19.25 to \$19.75 per fanega.  
 COCOA-NUTS—\$21.00 to \$22.00 per M., f.o.b.  
 COCOA-NUT OIL—\$1.15 per Imperial gallon (cask included).  
 COFFEE—Venezuelan,  $8c.$  to  $8\frac{1}{2}c.$  per lb.  
 COPRA—\$4.15 to \$4.25 per 100 lb.  
 DHAL—\$4.45 to \$4.70 per 2-bushel bag.  
 ONIONS—\$4.00 to \$4.50 per 100 lb. (retail).  
 POTATOS, ENGLISH—\$2.00 to \$3.00 per 100 lb.  
 RICE—Yellow, \$5.60 to \$6.00; White, \$5.75 to \$6.00 per bag.  
 SPLIT PEAS—\$5.50 to \$5.60 per bag.  
 SUGAR—Grocery grades, \$2.00 to \$2.50 per 100 lb.





A FORTNIGHTLY REVIEW  
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island of Tobago. A good deal of land in some parts of the island is being planted in cacao and rubber; the south-western districts, however, are not suitable for either of these; but the conditions appear favourable for growing Sea Island cotton. These districts are composed, for the most part, of abandoned sugar estates. The land generally is flat; the underlying rock formation is of coral, similar to Barbados, together with tertiary clays, sand, and shell beds; the rainfall is about 50 inches per annum.

For some time past one large estate, with more or less success, has been planted with cotton of the Marie Galante variety, but up to quite recently, no appreciable quantity of Sea Island cotton has been grown. The amount and value of the cotton, of all kinds, exported from Tobago during the last few years are as follows :—

Year.	Weight.	Value.
1905 ... ..	12,981 lb.	£386
1906 ... ..	11,497 „	284
1907 (up to June 30)...	1,800 „	55

Towards the end of 1905, a Silver medal was offered by the Imperial Department of Agriculture, on behalf of Sir Alfred Jones, the President of the British Cotton-growing Association, with the idea of encouraging the growth of cotton, and in the hope that a more extended area might be devoted to the production of the crop. With this object in view, 520 lb. of Sea Island cotton seed were supplied by the Department to the Superintendent of the Royal Botanic Gardens at Trinidad for distribution in Tobago. The conditions laid down were that competitors must have, at least 1 acre of Sea Island cotton under cultivation. Seed to plant up to 2 acres was supplied free of charge.

## Cotton Industry at Tobago.

IN view of the success which has been achieved by the introduction of the Sea Island cotton industry into the West Indies, efforts are now being made by the Government of Trinidad to establish a similar industry in the



Samples of cotton grown by Mr. A. H. Thomas, proved of good quality, and he was awarded the Silver medal (*Agricultural News*, Vol. VI, p. 184). The samples of Tobago seed-cotton, aggregating 300 lb. were afterwards sold to the Barbados Co-operative Cotton Factory, at prices varying from 6c. to 8c. per lb. Mr. Thomas' sample realized the highest price.

On June 26, a successful cotton meeting was held in Scarborough, when Mr. J. T. Rousseau, the Warden, presented Sir Alfred Jones' medal to Mr. Thomas, and an address on cotton matters was delivered by Mr. J. H. Hart, F.L.S., the Superintendent of the Royal Botanic Gardens. Mr. Hart explained the proposals of the Government, and the steps that were in progress for the encouragement of the cotton industry.

A ginnery is being built on the wharf at Scarborough (*Agricultural News*, Vol. VI, p. 168), which will contain three gins. The gins and steam power have already been landed. Mr. Hart mentioned that seed-cotton would be ginned and baled at 3c. per lb. of lint, and if the owners desired it, the cotton would be shipped to Liverpool, and the net proceeds paid to the growers.

Through the Imperial Department of Agriculture there has been recently shipped from Barbados, for use during the coming season, 1,034 lb. of selected cotton seed, and it is proposed to distribute this free among growers in quantities up to 12 lb.; any quantity over that is to be paid for at the rate of 6c. per lb. In addition, it is intended to start cotton experiment plots to serve as object-lessons. The site chosen for one of these will be on land on which Mr. Thomas grew the cotton that obtained the Silver medal.

It is hoped that the planters of Tobago will devote to their cotton fields the close and careful cultivation which is absolutely necessary in order to ensure successful results. In communicating with the Government of Trinidad in regard to the efforts for starting cotton growing at Tobago, the Imperial Commissioner of Agriculture recommended that the Curator of the Botanic Station, and the Agricultural Instructor should regularly visit the growers, and assist and advise them in reference to the details of cultivation, and with respect to the detection and control of the cotton worm and other pests. It will also be necessary to arrange, beforehand, for supplies of Paris green and lime to be conveniently ready for the use of growers; also for 'Acme' bellows, or suitable bags for applying the mixture (in the proportion of 1 part of Paris green to 6 parts of lime by weight), as required.

The attention of cotton growers at Tobago might be usefully directed to the fact that a new and enlarged edition of the Pamphlet entitled *A.B.C. of Cotton Planting* (price 6d.) has recently been issued by this Department.\*

The portions of the pamphlet that would specially repay attention are those describing the appearance and habits of the cotton worm and the best means of dealing with it. In the early stages the worm is a pale green caterpillar, and is to be found generally on the under sides of the leaves. The first signs of its presence are small holes in the leaves. The grower should walk through (not around) his field, and carefully look out for the worm day by day. When found all the plants in the immediate neighbourhood should be carefully dusted, especially on the under side of the leaves, with Paris green and lime.

As to the general prospects of cotton growing at Tobago, the Warden writes as follows:—

'According to Chief Justice Woodcock's *History of Tobago*, 1862, as mentioned in the *Agricultural News* (Vol. II, p. 293), we are told in the *Encyclopaedia Britannica*, 1854 edition, under the title of 'Cotton manufacture,' that in the year 1792, Mr. Jonathan Pollard, of Manchester, succeeded in spinning yarn upon the mule, of 278 hanks to the pound, from cotton-wool grown by Mr. Robley, in the island of Tobago. This yarn was sold, at 20 guineas per lb., to the muslin manufacturers at Glasgow. The cotton was of the finest quality ever brought to England. Mr. Robley carried on the cultivation of this article to some extent, but the price of cotton falling very low, and the cultivation of sugar becoming extremely profitable, he was induced to convert his cotton grounds into a sugar plantation. . . . Certainly there can be no place in the West Indies better suited to the production of cotton than the extensive plain on the south-west of Tobago called Sandy Point.

'Mr. Robley's estate, now known as Golden Grove, is the property of Dr. Latour, and in view of the above, there seems no reason why a high record should not be again attained.

'I think that this report will give a great impetus to the planting of cotton, and that the venture of the Government in erecting a cotton factory will prove, in the long run, a marked success, and will greatly aid in the development of the industry, and—as a natural result—of the prosperity of the island.'

\* The agent in Tobago for the sale of the publications of this Department is Mr. Charles L. Plagemann, Scarborough.



## SUGAR INDUSTRY.

### Cuba's Sugar Crop.

A report of the Secretary of Agriculture for Cuba on the comparative conditions of the crops for 1903, 1904, and 1905, shows that about ten million tons of sugar-cane were grown, and about a million tons of sugar produced, each year, the yield being about 10 per cent., and the average crop of sugar-cane per acre about 27 tons. Incidentally it is stated that the republic of Cuba includes about 28,000,000 acres of land, of which 16,000,000 are capable of yielding good crops under cultivation, and of which only 450,000 acres are thus far planted in sugar-cane. It is pointed out that if all the land in Cuba should go into sugar-cane, and the present yield be maintained, the annual crop of sugar would total some thirteen or fourteen million tons.

The reports from Cuba at the present time however, are not so cheerful in tone. The Cuban correspondent of the *Sugar Planters' Journal*, it is true, states that the sugar crop for 1906-7 is the largest known in the history of the island, and will probably reach 1,425,000 tons, as against 1,179,000 tons last year. But it is added that this large crop will return very little profit, owing to the low yield of sugar from the cane, consequent upon the fact that the latter was seriously damaged by flood and hurricane, and also because agricultural wages have lately ruled higher than at any other period in the history of the island.

The present indications point to a smaller crop next year, as practically no cane was planted during the past winter and spring, and the growing cane (sprouts from previous plantings) has been retarded by the severe drought. This drought has prevented the growing of grass, thereby obviating the necessity of weeding the fields.

### Sugar Production in Madeira.

The profitable production of the sugar-cane is only made possible in Madeira by the establishment of heavy protective duties, and, while under this system, the small grower appears to be prospering, the owners of the two large factories in the island, who have made an agreement to buy up all the cane produced there, are finding themselves in difficulties.

The following extracts, relating to the present situation of the industry, are taken from the *Report* for 1906, of the British Consul at Madeira:—

There are at present two up-to-date factories in Madeira, by far the larger and more important of which is British. This latter produced all the sugar manufactured, and the larger proportion of alcohol for the treatment of wines.

In addition to these, there are fifty small rudimentary mills, mostly driven by water and cattle, spread all over the island, which manufacture cane brandy for local consumption.

In view of a law, made in 1903, and guaranteed for fifteen years, to stimulate and encourage the production of sugar in Madeira, the two large factories sign a contract with the authorities annually, in which they bind themselves—first, to buy all cane offered them at the very high price of \$16.00 (£3 11s.) per ton; second, to buy from the small mills at the end of the year, at a high price stipulated by law, any excess of cane brandy the owners of those mills have not been able to sell during the year.

In consideration of these responsibilities, the two large factories have the following compensations: First, the monopoly of the manufacture of sugar, and also of alcohol for the treatment of wines; second, the right of importing molasses at a reduced duty of \$6.00 per ton, out of which a small quantity of sugar is first extracted, and the refuse made into alcohol; third, the right of exporting all sugar made from Madeira cane to Portugal free of duty.

The import duties on foreign sugar are very high, and it is only owing to these heavy protective duties that cane production can be made profitable in Madeira, as artificial terraces have to be constructed to keep the soil from being washed away, and the price of irrigation water is enormous.

Previous to the law of 1903, it was possible for the two large factories to undertake the purchase of cane at the stipulated high prices, as they had their compensation in the importation of molasses, since the annual cane crop of the island was at that time only sufficient to provide eight months' local consumption of sugar and brandy.

But the effect of the law of 1903 has been to give such an extraordinary impetus to the planting of cane that the production has now more than doubled. A result of this is, that very little molasses has been imported, and the manufacturers find themselves in great difficulties, as, whilst having to buy a much larger quantity of cane, and being inundated with cane brandy at the end of the year, their compensation of importing molasses has nearly disappeared.

Another difficulty also meets the two large factories in their obligation to buy the excess of cane brandy from the fifty small mills. Some of these small mills are taking advantage of the agreement, and are producing enormous quantities of brandy, with the sole idea of delivering it to the two large factories. These latter are making a determined stand against what they consider an abuse, and claim that they are only called on to accept the natural excess of cane brandy, and this only under certain equitable conditions.

As a certain class is using every effort to induce the Government to prohibit the importation of molasses in Madeira, notwithstanding that this importation is guaranteed to 1919, and as the molasses comes from British possessions in the West Indies, there is no doubt that it is of importance that the entire law of 1903 should be maintained.

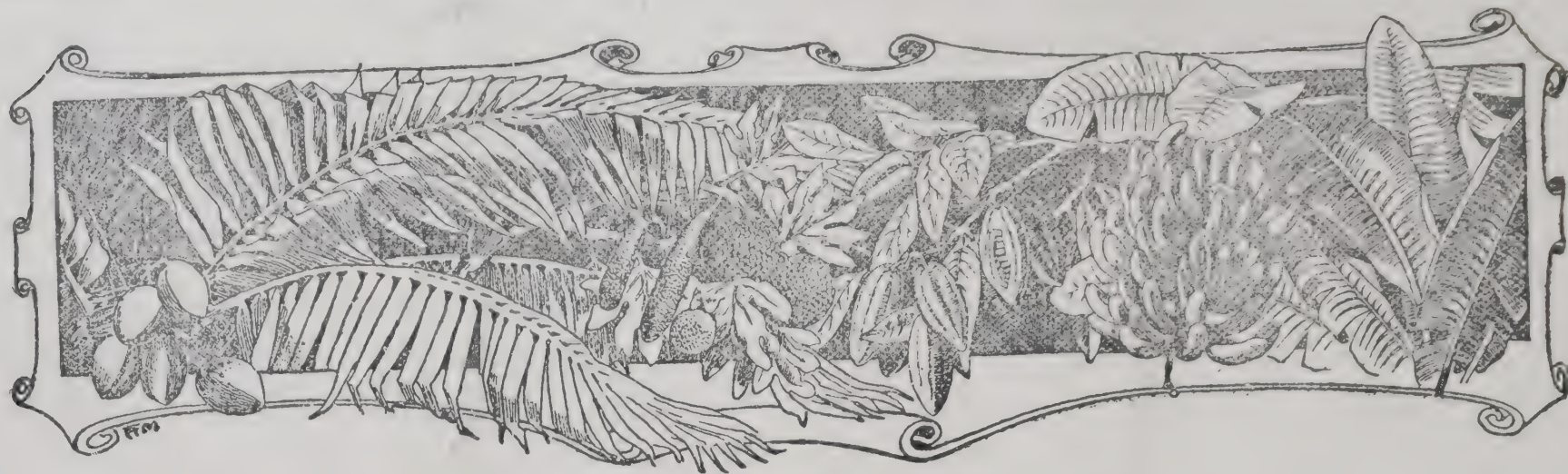
### The Sugar Market in the East.

The *Louisiana Planter* of June 22 last, gives some interesting particulars as to the great extent of the sugar-refining industry carried on at Hong-Kong, China. This industry has been long established, and during last year as much as half a million tons of sugar were dealt with. The greater part of this amount was cane sugar from Java, the Philippine Islands, and from adjacent British Colonies, the remainder being beet sugar from Europe.

The Philippines sent in to Hong-Kong over 75,000 tons, and the island of Mauritius about 25,000 tons, while Java found a market in Hong-Kong for some 315,000 tons. The imports of beet sugar from Austria, Belgium, and Germany aggregated about 41,000 tons.

Before the Hawaiian Islands became large sugar producers, refined sugars from Hong-Kong frequently reached San Francisco, finding a good market in the United States, notwithstanding the higher rates of duty placed on refined sugars.





## WEST INDIAN FRUIT.

### DOMINICA LIMES.

At the recent show of Colonial fruit held at Westminster, under the auspices of the Royal Horticultural Society, the Permanent Exhibition Committee of Dominica, were, for the second year in succession, awarded the gold medal of the Society—the highest distinction obtainable—for their exhibit of fruit. The fine display of limes was the great feature of the Dominica exhibit, and the Permanent Exhibition Committee were wise to so concentrate their efforts, for when this delicately flavoured fruit has become thoroughly well known in England, the demand is bound to be great. The Dominica trade with England in fresh limes may be said to have begun only in 1905, when they were shown at the Colonial Exhibition, but the way in which this trade has since developed speaks well for the merits of the fruit.

Mr. A. E. Aspinall, Secretary of the West India Committee, in a report on the Dominica exhibit to the Hon. H. A. Alford Nicholls, C.M.G., writes:—

Almost without exception, the fruit (which was again generously conveyed by the Royal Mail Steam Packet Company, freight free) arrived in first-rate order, the number of limes thrown out being not more than a dozen; but it was noticeable that those packed in the thicker paper were in decidedly better condition than those in the thin paper. Some of the limes were, however, exceedingly small, and therefore quite unfitted for the English market. The colour of the lemons was decidedly poor. The pine-apples were in excellent condition, though some of them were not quite ripe. The same remark applies to the christophines, mammee-apples, and jack-fruit sent. The mangosteens travelled much better than did similar fruit on a former occasion. The durians and bread-fruit which were packed in formalin were not quite so satisfactory. The solution seemed to have evaporated to an extraordinary extent, and the resultant vapour bade fair to burst the sides of the kerosene tin in which they travelled. The durians had broken open, disclosing their butter-like contents, though in this condition, they were objects of very great interest.

In awarding the prizes, the judges called special attention to the noticeable improvement in the general appearance of the fruit, the care taken in packing, etc., since Dominica first participated in these Colonial fruit shows, and they were unanimous in their decision to award the gold medal of the Royal Horticultural Society to the Dominica exhibit. They then inspected samples taken at random from

each of the cases of limes, and selected those from St. Aroment estate as being the finest specimens, and they accordingly awarded to that estate a silver Banksian medal. There seems to be little doubt that the question of size is an all-important one for the English market, which requires very careful nursing; and although the smaller fruit is often as good as the larger, it is undoubtedly the latter which attracts the purchasers.

A specially selected box of limes was sent to H.R.H. the Prince of Wales, and His Royal Highness graciously accepted this present from Dominica. A case was also sent to the Lord Mayor of London, which he was pleased to accept.

The *West India Committee Circular*, of June 25, commenting on the Dominica exhibit, says:—

Dominica is now reaping the benefits of her enterprise in participating in these exhibitions; but it is a little disappointing that they are not supported better by other colonies of the West India group. At a very small expense—the recent exhibition cost Dominica less than £20—it is open to them to make a display which would be fully as practical as that of Dominica, of which we are now speaking. To be of benefit, however, such exhibitions must be practical. Some definite object must be aimed at, whether it be to emphasize the advantages of some particular product or products, or to call attention to the attractions afforded by the islands as a field for settlers and a resort for tourists.

### EXPORTS OF FRUIT FROM HAWAII.

The following extract from the last *Annual Report* of the British Consul in Hawaii, bears witness to the rapidly increasing value of the fruit exports of the Hawaiian Islands:—

The export of fruit and nuts from these islands ranks next after sugar for the fiscal year under review. It amounted to £59,848, or nearly £20,000 more than the figures of the preceding twelve months. Almost the whole of this export is for consumption in the United States. The increase was forecast in my previous report, and it only remains to be seen how far the supply can be increased without fear of over-production. As regards the sources of supply, the extent of the demand would seem to be the only limit set to the increase of pine-apple cultivation in particular. Not only has the original plantation at Wahiawa near Honolulu been largely extended, but another company with the same object in view has been started in Hawaii, with its headquarters at Hilo.



## CITRUS INDUSTRY OF SICILY.

The *Pharmaceutical Journal* of May 18, gives the following information respecting the citrus industry of Sicily, which may be of interest in the West Indies at the present time, especially when considered in conjunction with previous articles in the *Agricultural News* (Vol. VI, pp. 83, 136, and 213), on the same subject:—

It does not appear to be generally known, even in Sicily, that the celebrated Sicilian lemon is grown on a bitter or Seville orange tree, grafted to bear the lemon. Scarcely any of the old stock of lemon trees now exist in Sicily. It was found that the lemon as a stock tree was too liable to disease.

The prospects for the growing of lemons were excellent until the autumn and winter just passed. Excessive rain, hail, and high winds have played havoc with the industry. The crop, which promised a high proportion of table fruit, has been so damaged that the greater part is unfit for other than conversion into by-products, such as essence, lemon juice, or citrate of lime.

No mechanical means have yet been devised for successfully recovering the essence from the skins of the lemons. The process of hand squeezing into a sponge still continues in vogue. Some proportion of the verjuice of the lemons is exported as crude stuff, but the majority is converted into citrate of lime by very primitive means.

Within the last few years much stir was made by a new process for the formation of citrate of lime, but this does not appear to have been a commercial success. Hardly any improvements have been made over the process generally adopted of heating the juice in a vat fitted with a rotating mixer. Over the vat, a cask is placed containing chalk mixed with water to the consistency of thick milk. The contents of this cask are allowed to run into the juice, with which it is mixed by the revolving agitator after the juice has been heated to 60° Centigrade. The mixing lasts from fifteen to twenty minutes until the resulting liquid becomes slightly brown. The acidity is regulated according to the requirements of the trade, more or less chalk being added to the vat.

When the heating and mixing are complete, a little milk of lime is added to cause precipitation. The contents of the vat are then run into a shallow tank, over which a canvas filter has been stretched. The citrate is raked over this with toothless rakes, in order to expel the excess of moisture, and is then filled into canvas bags, which are placed under pressure to further remove moisture. Finally the citrate, now fairly solid, is placed in a stove-heated room on boards to dry, when it is put into casks, lined with brown paper, ready for shipment. This is the ordinary process for the production of citrate of lime, as adopted in Sicily generally. That it is susceptible of great modification and improvement there can be little doubt. Formerly the chalk for the making of citrate of lime was procured from the United Kingdom; now it is imported from Venice, where marble-quarry refuse is calcined and ground for this purpose.

The quantity of essential oils of lemon, orange, and bergamot shipped from Messina to all countries, during the year 1906, was 451 English tons, against 413 English tons in the year 1905. The total shipment of concentrated lemon juice in 1906, was 888 English tons, 580 tons of which went to the United Kingdom. The exports of citrate of lime were 4,349 English tons, whilst those of 1905 were 3,043 English tons, showing an increase of 1,306 English tons. About 800 English tons were exported to the United Kingdom.

## SIR JOSEPH DALTON HOOKER,

C.B., G.C.S.I., O.M., D.C.L., LL.D., F.R.S.

On June 30, this illustrious man of Science (who has recently received the high distinction of the Order of Merit) attained his 90th year. In joining in the warm congratulations of his many friends, at home and abroad, it may be mentioned that not only Sir Joseph himself, but his father before him, while Directors of the Royal Gardens at Kew, rendered valuable services to the West Indies. In early days, they identified and made known the varied economic products of these Colonies, and trained men for taking charge of the Botanic Gardens, and to assist in many other ways in developing the resources of these Colonies. Sir Joseph, in retirement, still takes the keenest interest in the West Indies, and reads regularly the publications of this Department. He uses the good old brown sugar of Barbados in his coffee, and is very partial to West Indian bananas, oranges and limes. He made the acquaintance of the latter eighty years ago in Glasgow. He also smokes Jamaica cigars.

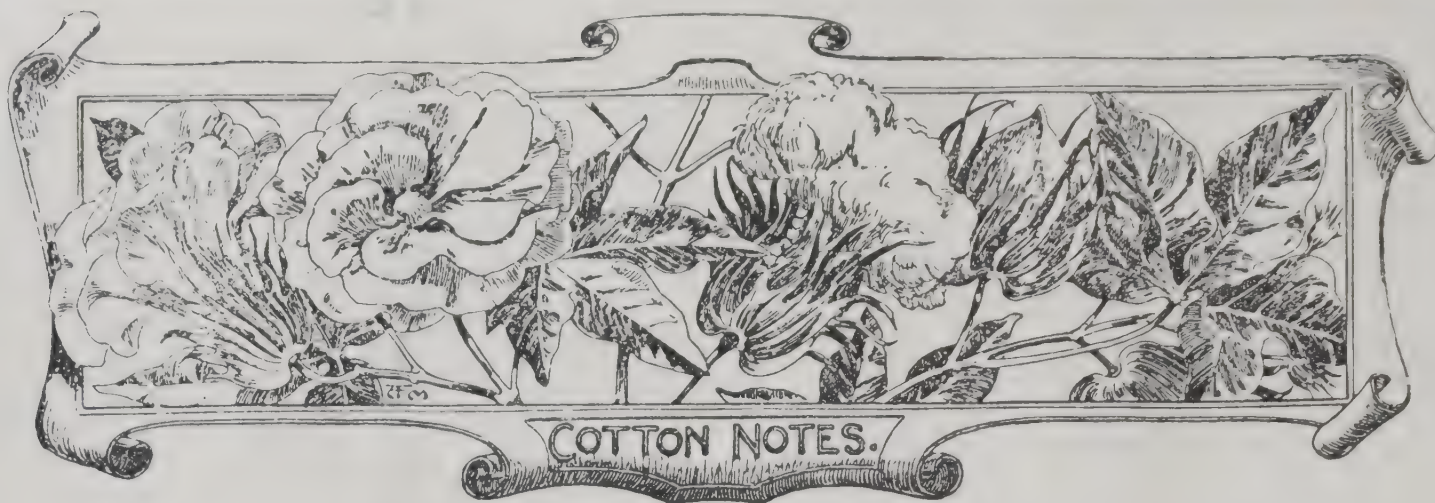
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HOW TO INCREASE THE EFFICIENCY OF TROPICAL AGRICULTURAL STATIONS.

The June number of *Tropical Life* contains an article under the above heading, pointing out that still greater advantages would arise if the directors of the several Agricultural and Botanic Stations were sometimes commissioned to travel abroad for the purpose of observing and studying at other centres what they can never learn at their own. The following extract is taken from the article in question:—

Probably many of the merchants and manufacturers at home who are benefiting by increased imports from tropical centres barely know by name the men to whose efforts the most recent increases are mainly due—cacao from the Gold Coast, rubber from the East, and cotton from the West Indies. Nevertheless, the undoubted advantages obtained by Sir Daniel Morris' short trip to the United States in 1903, to study cotton growing of Mr. Dawe through tropical Africa, and others, should reconcile us to any reasonable cost incurred in fitting out such expeditions; for even if the general public do not read the valuable reports these men publish, we use the rubber, wear the clothes, and eat and drink the cacao they help to bring into production. If we are to maintain the highly satisfactory system the Ceylon school and Mr. Ridley at the Straits have established as regards rubber, and that Sir Daniel Morris and Mr. Bovell have founded in the West Indies as regards Sea Island cotton, we must not rest on our laurels. Even in these two items fresh improvements in cultivation and preparation, in variety, and disease-proof kinds are being discovered every day, so we must continue to send men to study these improvements. When a man has found out a good thing, he does not always advertise it; being a private planter, he is perhaps only too anxious to keep it to himself. This is the difference between the scientific and the private investigator. Even when we believe we have the most suitable variety a 'sport' or 'hybrid' may prove to suit that spot better; so, at any rate, it is best to know of it. The practical man cannot afford to run around the world, or to make experiments; the scientific man ought to do so, and will—if given the chance.





## COTTON PROSPECTS IN THE SEA ISLANDS.

The Sea Island Cotton Report of Messrs. Henry W. Frost & Co., of Charleston, dated June 15, 1907, contains the following note:—

We have continued to have favourable weather throughout the week, and the advices from all three States continue to be more favourable.

### WEST INDIAN COTTON.

Messrs. Wolstenholme & Holland, of Liverpool, write as follows, under date of June 24, with reference to the sales of West Indian Sea Island cotton:—

Since our last report, about 400 bales West Indian Sea Islands have been sold, chiefly Barbados, Antigua, and St. Croix.

Prices are steady, but spinners' requirements are limited at present ruling prices, and if a much larger quantity came forward they would expect a considerable concession.

We understand however, that fortunately the crop is practically marketed, though some few consignments may come forward from Barbados and Antigua.

The sales include Barbados, 22*d.* to 24*d.*; St. Vincent, 22½*d.* to 24*d.*; Antigua, 22*d.* to 24*d.*; St. Kitt's, 21½*d.* to 22½*d.*; Barbuda, 19½*d.*; and St. Croix 21*d.* to 22*d.*; with a few stains 9*d.* to 10*d.*

### SEASONABLE NOTES.

The proper spacing of the cotton plants is a point that should receive careful consideration from the planter, and if it is not given the attention it deserves, trouble, and possibly disappointment, are likely to result.

Wide spacing, especially between the rows, is always advisable, but no exact rule as to the distance to be adopted in every case can be laid down. This is a point each planter must settle for himself. In deciding the matter he should be guided by his own experience, and by the experience of others on neighbouring estates.

The distance between the rows, however, should be such that the branches of the plants in one row do not interlace with branches from the adjacent rows on either side. Attention to this point will ensure a liberal supply of light and air to the lower parts of the plants, with the result that the production of bolls will be general, and will not be confined only to the upper parts of the plants.

With wide spacing between the rows, it is easier for the planter to pass up and down, to observe the condition of his

crop, and in this way he is more likely to notice the first appearance of attack from the cotton worm or other pest. The labourers could more readily treat such attack without danger of breaking the branches, and the gathering of the crop is much facilitated.

It should be remembered too, that wide spacing, with its consequent free admittance of light and air, prevents those conditions which are favourable to the development of fungoid pests on the cotton plant.

Past experience has shown, on most estates, that the most satisfactory results have been obtained when the distance between the rows has been from 5 to 6 feet. As to the distance from plant to plant in the rows, it is not so necessary that they should be widely separated, and excellent results have been obtained when the distance from plant to plant has been from 20 to 24 inches.

In sowing cotton seed, from 4 to 6 seeds are usually planted together in each hole. But, although every seed may germinate, the best seedling only should be allowed to remain. When the plants are two weeks old, the first thinning-out takes place, and at this time all but the best two seedlings in each hole are removed. A fortnight later at a second thinning, the poorer of these two is also taken up.

If the conditions are favourable, the young seedlings usually make their appearance about four days after the seed has been sown. In the case of any bare spots caused by failure of the seed to germinate, fresh seed should be planted not later than two weeks from the first sowing. Again, at the end of another two weeks, any further vacancies should be resupplied.

By the end of the second thinning a good 'stand' should have been obtained. From this stage onwards it is important that the fields should be kept clean, and careful attention should be given to the crop to detect the first symptoms of anything that may be going wrong. In the event of any insect or fungoid pest making its appearance, prompt remedial measures should be taken. The Agricultural Superintendents and Instructors can always be relied upon to give sound advice, and should be approached when any difficulties arise.

At a recent meeting held at Lower St. Andrew, Jamaica, in connexion with the cotton industry, Mr. L. G. Desporte stated that wealthy English capitalists had been induced to interest themselves in cotton growing in that island, and everything pointed to a future for the industry, if it were taken up in a co-operative way. He offered not only to purchase all the cotton produced, but also to finance each settler who had land, and was willing to grow cotton. The meeting was enthusiastic, and each of the landed proprietors present promised to put in 5 or 10 acres of cotton on their properties. (*Jamaica Telegraph*, June 26).



## SEA ISLAND COTTON.

The accompanying particulars relating to the characteristics of Sea Island cotton are taken from a book, published about twenty-five years ago, entitled 'The Structure of the Cotton Fibre,' and written by F. H. Bowman, D.Sc.:—

In Sea Island cotton we have the most perfect form of the cotton fibre, and for its length of staple, small diameter, general excellence, silkiness, and beautiful gloss, it always commands the highest price, and can be spun into the finest numbers. When examined under the microscope, it is easily seen that the general structure of the fibre is of a finer texture than that of other cottons, and that there is usually a large proportion of mature fibres in a boll. This probably arises from the fact that it is grown under climatic conditions which are peculiarly favourable to the development of all the qualities which are most desirable in cotton, and it is not improbable that, with a careful attention to the selection of seed and irrigation, a great improvement might be made in the general character of cotton fibres; indeed, I have in my possession a specimen of cotton grown far from the Sea Islands, in one of the American States, which rivals in length and silkiness of staple any cotton I have ever seen. The fineness of Sea Island cotton may be illustrated by the fact that it has been spun into counts as high as 2,150 hanks to the pound, so that 1 lb. of this yarn would extend upwards of 1,000 miles.

## COTTON GROWING IN ST. VINCENT.

It is evident from the following article, extracted from the *Kingstown Sentry*, of July 5 last, that cotton growing is well on the increase in St. Vincent, and that its establishment is looked upon by those well qualified to judge as a source of prosperity to all concerned:—

In connexion with the expansion of the cotton industry, it is with much gratification that we observe the activity of the small cultivators throughout the island. The fact that the 1906-7 crop more than doubled that of the preceding year, has elicited general commendation for those landed proprietors in St. Vincent who, from sheer enterprise, grasped the opportunity of retrieving their fallen fortunes. Such cotton growers as Mr. Alexander Smith, Messrs. J. H. Hazell, Sons & Co., Mr. C. J. Simmons (and not least to be regarded, Mr. Alex. Fraser and Mr. T. Layne who, working their small possessions side by side with the larger proprietors, obtained prizes at the local Agricultural Show for the excellent quality of their lint, as well as securing medals presented by Sir Alfred Jones for meritorious work in developing the cotton industry in St. Vincent) are undoubtedly the pioneers of the island's agricultural regeneration; and their exemplary conduct is being imitated in a degree that must result in lasting and substantial benefit to the whole community. Many landowners, discouraged by unfavourable experiences with regard to previous experimental crops in other products, and wincing under annually recurring losses, showed a pardonable reluctance to launch out at the first call of the Agricultural Department. But these gentlemen have been converted, and to-day their faith is rivetted to cotton with implicit confidence in its power to restore the island's prosperity. There has never been a greater awakening of the smaller landowners to the advantages of cultivating crops of marketable value in lieu of cheap ground provisions, than that which is now apparent everywhere. Taking, as an instance, a well known and

representative estate in Mesopotamia. In the fertile valley where this lies, a wonderful change has come over the appearance of the country, and valuable lands, which were formerly wasted in the growth of almost valueless vegetables, and a superabundance of bananas of ordinary variety, are now devoted to the cultivation of cotton, arrowroot, and sugar-cane. At the last Agricultural Show, Sir Daniel Morris very appropriately pointed out that no country can attain prosperity unless large industries be established and maintained therein. The present agricultural activity among small growers should be encouraged in every manner possible; and for this reason we urge that the Government should not be too anxious to part with the Central Cotton Factory. It has been a success in their hands. It can be utilized to support the local Agricultural Department, the continuance of which is a necessity; and, although we wish the prospective company success, we cannot conceal the feeling, which is shared by the majority of cotton cultivators, that the industry may be injured by a loss of that confidence which is felt by the people whilst the factory is being operated by the Imperial Department of Agriculture. We are not aware what are the terms of the offer the Cotton Company has made the Government, but we would advise the authorities to weigh the matter carefully before accomplishing the conveyance of a property so closely associated with the welfare of the whole community.

## DOMINICA AGRICULTURAL SOCIETY.

A general meeting of the Society was held at the Court House, Roseau, on the 26th ultimo, the Hon. H. A. Alford Nicholls, C.M.G., President in the Chair.

The President said that the suggested change of the name of the Society had been made the subject of a *referendum* to the members, with the result that less than 3 per cent. were against the alteration.

On the motion of Mr. A. R. C. Lockhart, seconded by the Hon. L. A. Giraud, the name was altered to that of the Dominica Agricultural and Commercial Society, and the rules were amended to enable the organization to perform the functions of a Board of Trade, when it is necessary to do so, the motion being carried unanimously.

A letter from Messrs. Head & Co., to the President, concerning the views of London underwriters on the suggested insurance of crops against hurricanes, was considered, and it was decided that the letter be published as one of the Society's leaflets, so as to enable every person interested to communicate his views before the matter was formally decided by the Council of the Society.

The Hon. Dr. Watts, C.M.G., then addressed the meeting on the subject of tillage and liming of soils, and he alluded to the valuable experiments conducted for a series of years at the Botanic Station in manuring cacao, by which it was found that mulching with dry grass and leaves produced better results than did the application of artificial manures.

The President pointed out that the wood ashes which formed an abundant product in the process of concentrating lime juice, besides being rich in potash, contained also lime and phosphates, and that lime planters should jealously preserve such valuable mineral manure from waste.

Mr. A. R. C. Lockhart gave details of interesting manurial experiments he had conducted on his estate, which bore out the statements of Dr. Watts, and he and the President disagreed with the statement made by certain planters, to the effect that vegetable matter for mulching purposes was difficult to be obtained on Dominica estates.



## EDITORIAL NOTICES.

Letters and matter for publication, as well as all specimens for naming, should be addressed to the Commissioner, Imperial Department of Agriculture, Barbados.

All applications for copies of the 'Agricultural News' should be addressed to the Agents, and not to the Department.

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# Agricultural News

VOL. VI. SATURDAY, JULY 27, 1907. No. 137.

## NOTES AND COMMENTS.

### Contents of Present Issue.

Particulars are given in the editorial of efforts that are being made to establish a cotton industry in Tobago. There is good reason to believe that the island will produce cotton of excellent quality.

The present peculiar situation of the sugar industry in Madeira is described in an article on page 237, and particulars are also given of sugar prospects in Cuba.

Information as to the success of the Dominican exhibit of limes at the recent Show of Colonial fruit in London, as well as to the prospects of the fruit on the English market, is given on page 228.

The process adopted in the preparation of citrate of lime in Sicily is described on page 229.

The proper spacing of the plants, as well as other necessary operations in the early stages of the growth of the cotton crop, are discussed on page 230. Particulars relating to the cotton crop of St. Vincent are given on the following page.

In view of the fact that corrosive sublimate solution is extensively used in the West Indies for disinfecting cotton seed, the information given on page 235, as to the power possessed by different kinds of wood to absorb the mercuric chloride from solution, should prove of interest.

### Canada's Sugar Supply.

The *Louisiana Planter* of June 29 last, commenting on the abatement in duty on British Colonial sugar imported into Canada, states that this has practically given Canada a monopoly of the West Indian sugar market, just as the United States reciprocity treaty with Cuba has given them the monopoly of all Cuba-grown sugar. The figures relating to recent shipments of sugar from Demerara to Canada go far to support the above remark of the *Planter*, for in May of this year, Demerara sent 5,824 tons of sugar to the Dominion as against 1,134 tons in May, 1906. In fact, with the exception of 18 tons only, the whole of the sugar exported from Demerara in May of the present year was shipped to Canada.

### A New Banana Preparation.

Those who have realized the nutritious qualities of the banana are anxious to popularize it as a regular article of diet, and it was with this idea in view that 'Bananine,' or banana meal, was sometime ago brought forward as a nutritious and easily digested article of food. Now, another product is announced as having been put on the market, consisting of the pulp of the banana, ground to flour, and mixed with triturated cacao (*Theobroma*) seeds, milk powder, and extract of malt. The description of the process of manufacture states that the peel of the mature banana fruit is removed, the fruit is pulped, dried and ground to powder. The essential oil, which has been extracted from the peel, is now added to this banana flour, as well as a proportion of dried milk powder and pure extract of malt, together with the paste prepared from the cacao seeds, and finally a sufficient quantity of sugar for flavouring. It is claimed for this composition that it possesses all the essential elements of a complete food in a concentrated form, namely, albuminoids, carbohydrates, and fatty substances.

### Protection of Wild Birds in Barbados.

The Legislature of Barbados has recently passed an Act for the protection of certain wild birds, (see *West Indian Bulletin*, III, 333, IV, 136) which provides that any person who sets out to kill or wound any of the birds included in the following list, is liable to a penalty not exceeding 10s. for each bird which he knowingly kills or wounds, or attempts to kill or wound.

The birds so protected are the Blackbird (*Quiscalus fortirostris*); Yellow Bird (*Dendroeca capitalis*); Pee Whittler (*Elainea martinica*); Rain Bird (*Tyrannus rostratus*); Large Humming Bird (*Eulampis holosericeus*); Small Humming Bird (*Orthorhynchus cristatus*); Wood-Dove (*Zenaida amabilis*); Ground-Dove (*Chamaepelia passerina*); Grass Canary (*Sycalis luteiventris*); Gold finch or Christmas Bird (*Setophaga ruticilla*); Thrush (*Margarops densirostris*).

The Act provides however, that any person desirous of acquiring specimens of any of the above birds for natural history purposes shall be entitled to kill the same for such purpose, on obtaining a licence to do so from the Governor-in-Executive Committee.



## Hints for School Gardens.

A new pamphlet, entitled *Hints for School Gardens*, prepared by Mr. A. H. Kirby, B.A., Agricultural and Science Master, Antigua, has just been added to the series issued by the Imperial Department of Agriculture, (price 4*d.*, free by post, 5*d.*).

It is stated in the preface that, at the present time, practically every primary school in the West Indies includes elementary agriculture in its curriculum, and that the pamphlet has been issued with a view to meeting the increasing demand made by teachers for directions as to the cultivation of plants in boxes and pots, and for laying out school gardens.

The first section, entitled 'Box and Pot Cultivation,' shows the great deal that it is possible to do to interest children in plant life—even if only a few boxes are used. A preliminary course of box and pot culture, such as this, is in any case advisable, as it affords children a good means of thoroughly mastering first principles.

A series of 'Preliminary Lessons in the Garden,' are next set out in the pamphlet, followed by special instructions for the cultivation of no less than twenty-five different garden crops familiar in the tropics, and, in the final section, detailed instructions are given as to the various operations of Budding, Grafting, and Pruning.

## A New Plant for the West Indies.

The Jaborandi plant, *Pilocarpus Jaborandi*, Holmes, is in demand for the sake of the alkaloid, pilocarpine which it yields, and which possesses valuable medicinal properties. An allied plant to the above, *Pilocarpus pennatifolius*, which contains the same alkaloid, and which was grown at the Botanic Station, Dominica, was recently forwarded to the Imperial Commissioner of Agriculture by Mr. J. Jones, Curator of the Station, with the view to ascertaining whether the plant was as valuable a source of pilocarpine as the other species.

Mr. J. R. Jackson, A.L.S., of London, reporting on the specimen leaves forwarded, states that they have been tested, and were found to contain 0.85 per cent. of pilocarpine, which is only a *medium* yield. Judging from the sample, it is estimated that the leaves might be worth from 6*d.* to 9*d.* per lb. If the leaves were less stalky however, the value might be a little more.

Mr. Jackson's report goes on to say that the official plant described in the British Pharmacopoeia as the recognized source of pilocarpine, is *Pilocarpus Jaborandi*, Holmes, mentioned above, and he points out that there is little doubt but that this latter plant would be well worth cultivating in suitable climates, inasmuch as the proportion of pilocarpine obtained is from half to as much again as that yielded by *P. pennatifolius*, and consequently, the leaves would fetch a much higher price.

Plants of *P. Jaborandi* are not at present grown in the West Indies, but steps are being taken by the Imperial Department of Agriculture to obtain specimens from Kew and elsewhere, with a view to establishing their cultivation in these colonies.

## Bananas *versus* Sugar in Trinidad.

It appears to be the opinion of some of the planters of Trinidad that the growing of bananas offers them better prospects of profit than does the cultivation of the sugar-cane at present, and this probably accounts for the fact, mentioned by a correspondent in the *Port-of-Spain Gazette*, that on an estate belonging to Mr. Norman Lamont, M.P., a beginning has been made in replacing cane cultivation by bananas. Other valuable and fertile estates in the neighbourhood belong to the same proprietor, and it is stated that the same change is proposed in regard to them all, although, sugar has been continuously grown on these estates for more than a century. Proprietors of estates will naturally grow the crops that offer them the best chances of profit, but in this case it is unfortunate that the change of crop will mean the displacing of a great deal of labour, inasmuch as the growing of bananas does not require the same amount of cultivation and attention which is necessary to the sugar-cane.

## Exports from Trinidad.

The recently published trade statistics of Trinidad show a continuous falling off during the last three years in the exported produce of the colony. While in 1904-5, the local produce exported was of the value of £1,857,278, it dropped to £1,721,905 in 1905-6, and again to £1,556,044 in 1906-7. The re-exports however, for the past year, show an increase of £35,000 in value over those of the previous year.

Cacao and sugar were the exports which showed the greatest decline during the past year, there being a decrease of no less than 43 per cent. in the *amount* of Trinidad cacao exported last year, as compared with the shipments of 1905-6, although, owing to the higher prices obtained, the *value* diminished by only 23 per cent. The 1906-7 sugar crop of Trinidad was normal, and the *amount* exported actually exceeded that shipped in 1905-6 by 8,800 tons, but, owing to low prices, the *value* was less by £21,800.

The chief exports showing an increase in value over that of 1905-6 are—asphalt, Venezuelan cacao, cocoa-nuts and their products, rum, and timber. The trade in asphalt increased both with Europe and with the United States.

The *value* of the Venezuelan cacao exported showed an increase of £14,700 over that of 1905-6, but there was a decrease in the *amount* received and transhipped.

The value of the cocoa-nuts exported advanced from £29,200 to £40,500, and that of copra from £12,200 to £24,200.

It is stated that there was a great demand for cedar, and this forced prices up very considerably. The value of the timber exported from Trinidad during 1906-7 (£57,018) exceeded that of the total of the ten previous years. The exports of fruit showed a slight increase, but the development is not so rapid as was anticipated.





## INSECT NOTES.

### Number and Size of Insects.

In his recently published work on Entomology, Dr. J. W. Folsom gives the following information in regard to the number and size of the members of the insect world:—

The number of insect species already known is about 300,000, and it is safe to estimate the total number of existing species as at least one million.

Among the largest living species are the Venezuelan beetle, *Dynastes hercules*, which is 155 mm. [over 6 inches] long, and the Venezuelan grasshopper, *Acridium latreillei*, which has a length of 166 mm. [ $6\frac{2}{3}$  inches], and a breadth across the wings of 240 mm. [ $9\frac{2}{3}$  inches]. Among Lepidoptera, *Attacus atlas*, of Indo-China, spreads 240 mm. [ $9\frac{2}{3}$  inches]; *Attacus caesar* of the Philippines, 255 mm. [over 10 inches]; and the Brazilian noctuid *Erebus agrippina*, 280 mm. [over 11 inches]. Some of the exotic wood-boring larvae attain a length of 150 mm. [6 inches].

The giants among insects have been found in the Carboniferous deposits, from which Brongniart described a phasmid (*Titanophasma*) as being one-fourth of a meter long.

At the other extreme as regards size, are beetles of the family Trichopterygidae, some of which are only 0.25 mm. [ $\frac{1}{8\frac{1}{2}}$  inch in length], as are also certain hymenopterous egg-parasites of the families Chalcididae and Proctotrypidae.

Thus, in point of size, insects occupy an intermediate place among animals; though some insects are smaller than the largest protozoa, others are larger than the smallest vertebrates.

The Hercules beetle mentioned above as occurring in Venezuela, is found also in Dominica and St. Lucia, and other insects found in the West Indies are of a sufficiently large size to be noted in this connexion.

The grasshopper, which is known as the locust in Trinidad (see *Agricultural News*, Vol. VI, p. 218), and which has a length of about 4 inches, and a spread of wings of nearly 8 inches (200 mm.), is one of the largest West Indian grasshoppers.

The God-horse of Barbados (*Bostra* sp.) attains a length of about 6 inches, not including the very long slender antennae, and in St. Vincent and Grenada a related insect, which has rudimentary wings and a prominently serrated thorax, has a greater length—8 inches.

Several of the West Indian Hawk Moths have a wing expanse nearly 7 inches, and at least one measures more than that.

The night witch (*Erebus odorata*) of the West Indies is slightly smaller than the related form mentioned above, with a spread of  $6\frac{1}{2}$  inches.

Among the extremely small insects found in the West Indies are some of the Parasitic Hymenoptera, and certain Diptera, which measure from  $\frac{1}{2}$  mm. [ $\frac{1}{50}$  inch] to 1 mm. [ $\frac{1}{25}$  inch] in length.

### Leaf-blister Mite in Jamaica.

In a letter received by the Imperial Commissioner of Agriculture for the West Indies from Mr. Conrad Watson, late of Montserrat, and now engaged in starting cotton cultivation in Jamaica it is stated: 'I have seen ratoon cotton here badly infested with the leaf-blister mite, so that the greatest care will have to be taken to control its spread.'

Mr. Watson has been asked to forward specimens of cotton leaves from Jamaica to be examined by the Entomologist on the staff of the Imperial Department of Agriculture. As, however, Mr. Watson has had considerable experience of the leaf-blister mite at Montserrat, there can be little doubt as to the occurrence of the pest at Jamaica. It is recommended that immediate steps be taken to destroy all ratoon cotton during the coming season, and that a careful watch be maintained for the mite during crop time. As already indicated in the publications of this Department, the leaf-blister mite can be kept under control if taken in time. It is described, and suggestions offered for its treatment, in the new and enlarged edition of the *A.B.C. of Cotton Planting*, pp. 66-9; also in the *Agricultural News* and the *West Indian Bulletin*.

The Educational Supply Company, Kingston, are the Jamaica agents for the sale of the publications of the Department.

### The Guava Lobster.

A correspondent in St. Vincent has recently forwarded to the Imperial Commissioner of Agriculture, drawings of a large insect which is occasionally found in that island, with the information that it is known as the 'Guava lobster,' and that it is also found in Bequia. It is also known to occur in Grenada.

This insect belongs to the family Phasmidae, of the natural order Orthoptera. To the Phasmidae belong the 'stick insects' or 'walking-sticks,' and the leaf insects.

The St. Vincent specimen, from which the drawings were made, measured 8 inches for head and body, and had antennae 3 inches long, giving a total length of 11 inches.

In another article on this page some notably large insects are mentioned, and it will be seen that this Phasmid, which is referred to there as being related to the God-horse of Barbados, compares very well in point of size with some of the largest of the world's insects.

The Phasmidae are all vegetable feeders, and many of them show in their structure remarkable protective adaptations. The 'walking-stick' of North America, the God-horse of Barbados, and a smaller stick insect, common in the West Indies, all so closely resemble dry twigs in general appearance as to be very difficult to find among the leaves and branches of trees and shrubs, so long as they remain quiet. They are very conspicuous when in motion, on account of their long legs and clumsy gait. Others bear great resemblance to leaves.

Although many of them are large insects, and voracious feeders, they produce but few eggs, and these are merely dropped to the ground, where they remain, exposed to many dangers, till they hatch. In shape and appearance the eggs of many Phasmids resemble seeds.

The Phasmidae, of which about 600 species are known, are mostly found in warm countries.

Writing of these insects, one author says: 'Although the number of species of Phasmidae is small in comparison with what we find in many of the large families of Insecta, yet there is probably no other family that equals it in multiplicity of form and diversity of external appearance.'



## SCIENCE NOTES.

### Absorption of Mercuric chloride solution by different kinds of Wood.

The attention of this Department has been drawn to a statement, made by Drs. D. E. Salmon and T. Smith, in discussing disinfectants for infectious diseases of cattle, that corrosive sublimate (mercuric chloride) should not be used in wooden vessels, inasmuch as a tannate of mercury is formed. Experiments were therefore started by Professor d'Albuquerque and Dr. Longfield Smith at the Government Laboratory, Barbados, to inquire into the relative absorption, by different kinds of wood, of a solution of mercuric chloride. The strength of the solution was 1 part of mercuric chloride to 1,000 parts of water, and the experiments were carried out, with a view to ascertaining whether the use of this solution for the disinfection of cotton seed should, in any way, be modified.

Several different kinds of wood were treated with the mercuric chloride solution. All the different kinds of wood were found to absorb mercury gradually from the solution, but not to the same extent. Three strips of each kind of wood, measuring 4 inches by 2 inches by  $\frac{1}{2}$  inch, were used in each experiment; these were soaked in 250 cc. of 1 in 1,000 mercuric chloride solution. This solution was tested for mercury every day by adding potassium iodide, and when the solution ceased to give a precipitate it was poured off, and a fresh lot of 250 cc. of mercuric chloride solution added.

The first 250 cc. was entirely used up by all the woods, except the deal, in two days; successive lots of 250 cc. took longer and longer before all the mercury they contained was absorbed. When the wood takes over a week to absorb all the mercury, it may be said to absorb it very slowly. The following results were obtained with the different kinds of wood:—

1. Deal absorbs very slowly after the 2nd soaking.
2. { Pine } absorbs very slowly after four  
  { Puncheon 'hardwood' } soakings.
3. { New York oak } absorbs very slowly after five soakings.  
  { Mahogany }
4. Bully Tree absorbs very slowly after seven or eight soakings.

These experiments indicate that 66 square inches of wood surface of New York oak, require soaking five times with  $\frac{1}{2}$  pint of corrosive sublimate solution of 1 in 1,000, or once with  $2\frac{1}{2}$  pints of the same solution, before saturation with mercuric chloride has been brought about.

The average surface area of a Barbados puncheon (114-124 gallons) is about 3,000 square inches, and it is concluded from these experiments that one preliminary soaking of, say, eight weeks' duration, with corrosive sublimate solution would saturate the wood, and prevent any further absorption.

It is further concluded that, although absorption of the mercuric chloride solution does take place, preliminary soaking would be unnecessary in cases where the solution used for disinfection is not allowed to remain in the barrel more than one day.

In the case of mahogany and New York oak it was found that not only did tannin pass abundantly into the solution when mercury was being absorbed from it, but also after the absorption of mercury had practically ceased.

Soluble mercuric salts are all poisonous, and it appears improbable from chemical considerations that the presence of tannin would materially affect the disinfecting power of the solution. The point however is one that could only be decisively settled by mycological experiment with the solutions containing tannin.

In view of these results, it would appear to be necessary that the recommendation, made in the *Agricultural News* (Vol. VI, p. 183) with reference to the disinfection of cotton seed, should be somewhat modified. A solution of 1 in 1,000 corrosive sublimate should be made up, and allowed to stand for some days, so as to complete the reaction between the wood of the vessel and the corrosive sublimate. This should be thrown away, and a fresh solution made up for the disinfection of the seed, and it would appear that 'it is advisable to use a new solution for each new batch of seed.'

### Mahoe-Piment (*Daphnopsis tinifolia*, Meisn.).

Specimens of twigs and flowers from a tree known as Mahoe-piment have recently been forwarded to this Department by the Curator of the Botanic Station, Dominica, for purposes of identification. Mahoe-piment is the common name for *Daphnopsis tinifolia*, Meisn., a forest tree, ranging throughout tropical America and the West Indies. It belongs to the Spurge-Laurel, or Lace-bark order, Thymelaeaceae.

The tree varies in height from 20 to 30 feet, and is found in the southern and western mountains of Jamaica, and in other West India Islands. The shortly petiolate leaves are exstipulate, alternate, entire, lanceolate-oblong, and they vary from 3 to 4 inches in length. The small, greenish-yellow, dioecious flowers are collected together in cymose flower-heads. The fruit is a berry that is much longer than the fruit-stalk, and it contains an acrid principle that acts as a blister upon the skin. In Dominica, cattle are said to have been poisoned by feeding on the berries.

The order Thymelaeaceae includes plants possessing a remarkably tenacious inner bark, and a caustic juice. The Lace-bark tree of Jamaica (*Lajetta lintearia*) belongs to this order. The inner bark or 'lace-layer' produces a beautiful fibre that is well suited for the manufacture of delicate ornaments such as lace collars, fans, doyleys, etc. The bark is first of all carefully removed through considerable lengths of the stem, and when pulled open, there appears a pentagonal and hexagonal mesh, which is the fibrous 'lace layer.' There is another plant, *Daphnopsis tinifolia*, Gries., known as 'Burn-nose' or 'Bonace' in Jamaica, and the fibre from the inner bark of this is used for ropes and cordage.

The Mahoe-piment (*Daphnopsis tinifolia*, Meisn.) does not belong to the true Mahoes, which are included in the natural order Malvaceae. The Congo mahoe (*Hibiscus clypeatus*, Linn.), is a red-flowered shrub native to Jamaica, of 6 to 12 feet in height, and yields a fibre that is used for cordage and whip-lashes. The seaside mahoe (*Hibiscus tiliaceus*, Linn.), is a tree 10 to 20 feet high, with roundish leaves and large yellow flowers, and also affords a strong fibre. The blue or mountain mahoe (*Hibiscus elatus*, Sw.), is a West Indian tree, 50 to 60 feet high, with roundish leaves and large, purplish, saffron-coloured flowers, and yields what is known as 'Cuba bast.' This was formerly used for tying plants in gardens, as well as for tying up bundles of Havana cigars, and it is also used, after bleaching, for making ladies' hats. The wood, which is of a dark, blackish colour, with darker or lighter bands, is very flexible and durable, and is used by cabinet makers, and in the manufacture of fishing-rods, gunstocks, etc.





## GLEANINGS.

Seed of the Central American rubber tree (*Castilloa elastica*), is now ready for distribution at the Botanic Station, Dominica, and planters can obtain supplies on making application to the Curator, Mr. Joseph Jones.

There appears to be a large increase in the use of artificial manures in Egypt as, according to the figures given in the *Chamber of Commerce Journal*, the value of the imports in this line has increased from £6,000 in 1901, to £135,000 in 1906.

In consequence of the resignation of Mr. Rudolf Penn, which will take effect as from July 31 next, there is a vacancy for a resident master at the Agricultural School, Dominica. The salary attached to the appointment is £40 per annum, with free quarters.

The figures giving the exports of sugar from Java during the year 1906, indicate that shipments to British India, Japan, and Australia show a distinct increase, while the exports to the United Kingdom and America show a marked falling-off. (British Consul's *Report*, 1906.)

It is reported from Java that an engineer on a sugar estate in the island has invented a machine which will greatly simplify the cutting of canes in the field. By its aid, it is said, two men can cut as much as 18 tons of cane a day, and further experiments are being proceeded with.

The *Louisiana Planter*, of June 15 last, states that the employment of poor Italian immigrants on cotton plantations in Arkansas has given very satisfactory results. The Italian workmen are described as industrious, thrifty, and generally temperate, and they surpass the negroes, both in the amount and the quality of their work.

The annual production of sugar in Queensland, Australia, is now reported to be equal to 182,000 tons, while in New South Wales, the cane crop of the present year is estimated at about 25,000 tons. In Victoria, which lies so far south of the equator that cane growing is not practicable, efforts are being made to create a beet sugar industry.

Two creole-born Maltese donkeys are offered for sale at the Skerretts Stud Farm, Antigua. One is a jack donkey rising four years old, height over 12 hands, offered for £60; the other is a jenny, rising three years, over 12 hands, offered for £30. Applications may be addressed to the Superintendent of Agriculture, Antigua.

The Hawaiian crop of sugar for the year 1906 is reported to have amounted to 429,213 short tons (one short ton equals 2,000 lb.). This is the largest crop these islands have produced, with the exception of that for 1903, which exceeded it by about 8,700 short tons.

The British Consul at Java, in his 1906 *Report*, states that during the past year the prices for both Java and Liberia coffee improved, and the crops were well up to the average. It is added, however, that as regards the 1907 crop, the prospects were unfavourable, as heavy rain had done serious damage to the blossom.

At a recent meeting of the Cotton Spinners' and Doublers' Association (Ltd.), it was stated by Sir William Holland, M.P., that if it had not been for the fine Sea Island cotton produced in the West Indies during the past few years, it is probable that a good many of the mills using the finer grades of cotton would have been obliged to work short time owing to the scarcity of the raw material. (*Standard*, June 7, 1907.)

It was mentioned in the *Agricultural News* (Vol. V, p. 174) that the butter from the Shea butter tree (*Butyrospermum Parkii*) is largely used in cooking operations by the natives in West Africa. Experiments carried out in France with this product show that the refined butter, mixed with cocoa-nut oil, makes an excellent artificial butter, which can hardly be distinguished from the real dairy product. (*Consular Report on West Africa*, 1906.)

It appears from the returns published in the *Official Gazette*, and recently presented to the Barbados House of Assembly, that the sum of £532 11s. 2d. has been paid out for the destruction of mungoose in the island during the three years which have elapsed since the passing of the Mungoose Destruction Act of 1904. This sum represents the destruction of no less than 38,732 mungoose. St. Andrew's is the parish in which the greatest number of animals was killed.

A planter from Louisiana has recently purchased over 12,000 acres of land for the purposes of a sugar plantation, in the Mexican State of San Luis Potosi, near the Mexican Central Railway. It is said that the lands in this neighbourhood produce immense crops of sugar, even under the antiquated system of production which still prevails, and with improved methods of cultivation, it is hoped that the crop will be doubled. (*American Beet Sugar Gazette*, June 20, 1907.)

The reports of the International Association for sugar statistics show a slight falling off in the production of beet sugar in Europe during the last two years. The number of active factories this year is 1,345 as against 1,362 in 1906. The total area under beet roots this year is 3,963,070 acres, as against 3,980,560 acres last year, and 4,158,220 acres in 1905. This is a diminution of 17,490 acres since last year, equal to .44 per cent. Germany, Belgium, Denmark, and Austria show a decrease, while Spain, Sweden, Holland, and Italy have increased their crop. The observed reduction is stated to be due to the fact that a very large part of the land cultivated has been in beet for a series of years, and its fertility is consequently reduced.



## AGRICULTURAL SCHOOLS.

### St. Vincent.

The following is the general report of the examiner (Mr. F. A. Stockdale, B.A.) on the recent half-yearly examination of the St. Vincent Agricultural School:—

Four boys took the papers set for the senior class, fourteen those set for the junior class, and there were two new boys. Mc.Connie is top of the seniors with 81 per cent. of the total marks, and Brown is top of the juniors. The average percentage of marks of the seniors is about 72, and that of the juniors about 58. This average percentage has improved since the last examination, and it is probable that the improvement has been the result of dividing the pupils at the school into two classes. I would suggest that Brown and John be now promoted to the senior class, if the resident Master-in-charge is of opinion that they have been sufficiently grounded in their elementary work. Cruikshank is still bottom of the juniors, and has not made much improvement.

The arithmetic is the best of the more important subjects, five boys having obtained full marks, but there is still a tendency amongst some of the pupils to cramp their working into a very small space. Agriculture and Botany have greatly improved since the last examination, but Chemistry is still very weak and should receive careful attention. I would again recommend that extra time might be given to the instruction of the students in this last subject.

Geography has improved, but some of the lowest of the junior class should receive extra attention. More time might be given to the drawing of maps and plans, as many of those submitted in this examination were untidy, and carelessly done.

The Composition and Dictation papers were, on the whole, satisfactory. The arrangement of facts in the essays has greatly improved, the subject-matter being divided clearly, and under sub-heads.

The new boys have made a satisfactory beginning, but their Geography is rather weak.

### St. Lucia.

Mr. Stockdale's report on the St. Lucia Agricultural School is as follows:—

Twenty boys sat for the examination; four took the papers set for the senior class, fourteen those for the juniors, and two were new boys. Alexander is top of the seniors with 73 per cent. of the total marks, exclusive of the Practical Geometry paper, and Gabriel is top of the juniors, with a percentage of 65. The average percentage of marks obtained by the seniors is about 70, and that of the juniors about 56.

The work of the senior class was, on the whole, satisfactory, and improvement has been made throughout. The Agriculture during the last year has shown great improvement, and Botany and Chemistry are fairly satisfactory. The arrangement of facts should still continue to receive careful attention, and it would be advisable to divide all answers under sub-heads. Geography is only fair, and the essays were not particularly good. The schoolmaster will require to give increased attention to these subjects amongst the seniors.

The junior class has improved since the last examination,

but there are some boys who should receive still further attention, especially in Agriculture. The Chemistry is still weak. Extra time might profitably be given to this subject. Arithmetic has greatly improved since the last examination, for the papers, on the whole, were much more tidy and accurate than in December last. The Geography was much better, and the essays were generally satisfactory.

The new boys sent in fair papers on Arithmetic, Composition, and Dictation, and appear to have made a good beginning.

### A NEW GOAT BOOK.

In reviewing *La Chevre*, a new goat book by Joseph Crepin (London: Hachette et Cie. 7fr. 50c.), the *Spectator* states:—

This is in some ways the best goat book yet published. It is scientific, comprehensive, and up-to-date, and the photographs of different types of the 'poor man's cow' with which it is illustrated, are most valuable. Those of our readers who are interested in goats will do well to place it on their shelves alongside Mr. Holmes Pegler's 'Book of the Goat,' and Mr. Bryan Hook's 'Milch Goats.' The publication of this considerable work is one more indication of the increasing interest in a source of milk-supply which is cheap, and in this country above suspicion of tubercular taint. M. Crepin commends the Nubian, the Maltese, the Murcian, and the Alpine varieties, the Saanen and Toggenburg being included under Alpine. The heaviest milker in England is probably a goat in Essex, which has given a gallon in the presence of the secretary of the Goat Society. M. Crepin tells us about an Alpine goat which 'when newly kidded, and owing to a wonderful appetite and exceptional feeding and milking,' yielded some *seven quarts* daily for three weeks!

It may be mentioned that the Nubian and Toggenburg goats referred to above have already been introduced to the West Indies by the Imperial Department of Agriculture; as also a specially fine breed of goats from the Punjab, Northern India. If well cared for, and well fed, a first-class goat is likely to prove as productive as any animal in these colonies.

### DEPARTMENT NEWS.

The Right Honourable the Secretary of State for the Colonies has approved of the Imperial Commissioner of Agriculture proceeding on duty leave to attend the Canadian National Exhibition, which will be held at Toronto, from August 26 to September 9 next, and afterwards to attend and take part in the 'International Conference on Plant Hardiness and Acclimatization' to be held on September 30, and October 1 and 2, under the auspices of the Horticultural Society of New York.

Mr. W. N. Sands, Agricultural Superintendent of St. Vincent, has been employed on a mission to St. Lucia, to report on the suitability of certain districts in that colony for the cultivation of Sea Island cotton. Mr. Sands returned to St. Vincent by R.M.S. 'Esk' on the 23rd inst.



## TOBACCO IN THE TRANSVAAL.

In a paper on 'The Agricultural Possibilities of the Transvaal,' read before the Royal Colonial Institute, London, on May 29 last, Mr. J. Burt-Davy, F.L.S., Government Botanist of the Transvaal, made the following reference to the tobacco industry in that colony, which, it will be observed, appears to possess good prospects for the future:—

This will, perhaps, be the most important of the future crops of the Transvaal, and is best suited to sheltered parts of the Bush veld, along the Magaliesberg Mountains and the foot hills of the Drakensberg. Magaliesberg tobacco has obtained a good reputation in South Africa; but, owing to the fact that each farmer cures his own crop, there is a serious lack of uniformity in the product, which reduces its commercial value.

Successful experiments in the growing of cigarette and cigar tobacco have been carried out at the Tzaneen Experiment Farm of the Department of Agriculture, and cigars and cigarettes of very fair quality have been produced. There is every reason to believe that, under the direction of Mr. Van Leenhoff, the recently appointed tobacco expert, who has had a long and thorough training, a good export article will soon be produced.

A factory and curing houses of the most approved type are being put up near Rustenburg, in the heart of the Magaliesberg tobacco country, and the Department intends to buy up the tobacco from the farmers for treatment on scientific lines.

## TREATMENT OF ANTHRAX.

The above is the title of a leaflet which has just been published by the Imperial Department of Agriculture, in view of the fact that Anthrax has recently been very prevalent in St. Vincent, and is not unknown in other parts of the West Indies.

The leaflet aims at making widely known the nature of the disease, and the best means of getting rid of it, and with this idea in view it gives, in a very simple manner, and in question and answer form, information for the guidance and instruction of those living in districts or islands where anthrax has broken out among cattle, horses, or small stock. Copies of the leaflet can be obtained gratis, on application to the Imperial Department of Agriculture, Barbados.

Anthrax has been described, in a recent number of *Farm Life*, as the most dangerous live-stock disease to which agriculturists are exposed, and wherever it occurs, it is a source of immediate danger not only to stock, but also to human beings, and it is at once necessary to deal effectively with it. While anthrax exists in any district or island, stock-keepers are liable to suffer considerable loss, and they are also unable to dispose of their animals by shipment or otherwise.

The duty of everyone, in the face of an outbreak of anthrax, is to do all that is possible to assist those engaged in getting rid of the disease, and to have his animals inoculated as soon as possible.

It may be added that there is no danger or risk of any kind incurred in having animals inoculated by competent persons; in fact, it is a safeguard that should commend itself to the warm support of those who own animals, and are anxious to save them from contracting the disease.

## CASSAVA FLOUR.

In reference to the production of cassava flour for use by textile manufacturers in Lancashire and elsewhere, the following information has been received by the Imperial Commissioner of Agriculture from the Hon. H. H. Cousins, M.A., Government Chemist, as to the value of the cassava starch exported from the island of Jamaica:—

With reference to the 'cassava flour' matter referred to in your letter J. 1,953, I can state that the latest sales of cassava starch made in Jamaica have been at £14 per ton, c.i.f. Liverpool. I also know of a contract made last year for a regular supply, at £16 per ton for a well-made starch. Our Jamaica starch has been proved greatly superior to the East Indian cassava starch.

## MONKEYS AT BARBADOS AND ST. KITTS.

In the *Agricultural News* (Vol. VI, p. 201) there appeared a note in reference to the origin of the monkeys that are still found in a wild state in certain parts of Barbados and St. Kitt's. It was suggested that although fairly plentiful at Barbados as early as 1680, they were really of African origin.

The following letter, dated June 25, 1907, received by the Imperial Commissioner of Agriculture for the West Indies, from Dr. P. Chalmers Mitchell, F.R.S., Secretary of the Zoological Society, London, would appear to settle definitely the question of origin:—

Thank you for your interesting letter of May 29. I think there is no doubt whatever that the monkey to which you refer as having been abundant at Barbados in 1682, and still to be found in that island, is an African monkey, introduced there with the Slave Traffic. So far as information goes, there is no monkey indigenous to the islands north of Grenada. Skins of the Barbados monkey have occasionally been sent to this country, and there is one in the British Museum which has been identified with the African form, *Cercopithecus callitrichus*, a native of Sierra Leone. Mr. Pocock, the Superintendent of the Gardens, has recently been working at the species of *Cercopithecus*, and if it were possible at any time to send a series of skins to him, it would be of great interest, as he has now got together a large collection with which to make comparisons.

In commenting on Dr. Mitchell's letter as given above, Mr. C. P. Clarke, M.C.P., writes on July 17, as follows:—

I have no doubt Dr. Mitchell is correct; for Ligon, who wrote a very full account of Barbados as he saw it in 1650, with descriptions of all sorts of animals—quadrupeds, insects, reptiles, etc.—makes no mention of the monkey.

In August 1671, Mr. John Reid, Agent of the Royal African (Slave-trading) Company wrote Lord Arlington (Secretary of State) as follows: 'This island affords nothing worthy of your Lordship's acceptance, but I have delivered Captain Barnett a monkey to be presented to her ladyship, being confident it will please her, for it is the finest I ever saw.'

If live specimens of the Barbados monkey (or a skin or two) were available, the Imperial Commissioner of Agriculture would be happy to receive and to forward them to the Zoological Gardens in London. It would be desirable to send a live specimen (or a skin or two) of the St. Kitt's monkey as well, in order to complete the investigation.



## RUBBER IN PENANG BOTANIC GARDENS.

The following extract from the report for 1906, on the Botanic Gardens, Penang, gives information with reference to Para rubber (*Hevea brasiliensis*):—

The old Para rubber tree at the gardens was tapped in November and December, and 4 lb. 4½ oz. of dry rubber were obtained. The tree reached the height of its production in 1905, when 4 lb. 12½ oz. of dry rubber were obtained, and it has given a total production of 35 lb. 13½ oz. from the time when it was first tapped. The experiment garden on Penang Hill has been abandoned, but experiments were made on four of the Para rubber trees standing there at an altitude of about 2,000 feet above sea-level. The age of the trees was about twelve years, and the total dried rubber obtained was 6 lb. 6 oz.

## ARTIFICIAL PRODUCTION OF RUBBER.

In a recent number of the *Bulletin of the Straits and Federated Malay Settlements* (Vol. V, p. 372), Mr. H. N. Ridley, M.A., F.L.S., Director of the Botanic Gardens, Straits Settlements, criticises the statements made by Professor Wyndham Dunstan, at the York meeting of the British Association last year (*Agricultural News*, Vol. V, p. 283), to the effect that the application of chemistry to rubber production will, in the future, enable caoutchouc to be economically separated from the latex of plants which contain it in what is now looked upon as too small a proportion to be worth troubling about, and that the synthetic production of rubber in the laboratory by purely chemical methods will, in all probability, be realized in the near future. Mr. Ridley says:—

For the first point to be one of real practical importance it would be necessary to find a plant, producing latex that contains rubber, which can be more easily grown, and produces so much latex that even the small quantity of caoutchouc it contains will be sufficient for it to compete with, say, *Hevea brasiliensis*. Thus, say a latex contains one-eighth the amount of caoutchouc produced by *Hevea*, the plant would have to produce more than eight times the amount of latex to compete, as the extraction of the rubber from this thin latex would obviously cost more than from the richer latex. It is hardly probable that this would be discovered now. Still other latices might be utilized in a small way, such as those of the Jack tree, which might possibly pay for extraction in some parts of the world. But a discovery of this nature, i.e., of a method of utilizing the sticky immature rubber, or viscin, as it is commonly called, would be of some importance to the Para rubber planter, for by it he would be able to utilize the thin sticky rubber from leaves and twigs of his Para trees and the tappings from the nursery beds, so that, on the whole, any such discovery, almost certain to be made, would rather benefit him than injure his business.

Synthetic rubber has been the bogey of many would-be investors in rubber planting, and no question is more often asked than: 'Is it likely that synthetic rubber will soon be invented, and the plantations ruined?' As Professor Dunstan writes: 'Rubber having all the qualities of a good caoutchouc has been made from isoprene, which has been prepared from oil of turpentine.' It surely needs hardly any pointing out that the slow-growing expensive turpentine trees, inhabitants of cold climates where labour is extremely costly, could not, for a minute, compete against the rapid-growing Para rubber

tree, in a climate where labour is cheap, especially when from the *Hevea* we get the rubber fully prepared when the latex is drawn from the tree; whereas in the turpentine, it has to be made into isoprene, and then into rubber. Isoprene must be made far more cheaply than in this way to compete with Para rubber. It is certain that we shall be able to lower the cost of the production of rubber very considerably in the next few years, perhaps to little more than half its present cost. Can any substance be found from which isoprene, or any other hydrocarbon convertible into rubber, can be obtained and converted at a cheaper rate? This is hardly probable.

## COAGULATION OF RUBBER LATEX.

The *India Rubber Journal* of June 17 last, contains an interesting article describing some experiments which were recently carried out with the view of ascertaining the influence of the agent used in coagulating the latex, upon the character of the resulting rubber. It is evident from the results obtained that the method adopted in coagulating the latex is of great importance to the structure of the rubber, and influences especially its elastic properties. This means that the same latex, coagulated by different methods, will give rubbers of different values. These results are most interesting, and go far to show that inferiority in a given rubber is quite as likely to be due to defective methods of coagulation as to the quality of the latex.

In the experiments in question, various reagents were added to the latex, contained in flat dishes, care being taken to distribute the precipitant throughout the liquid with as little agitation as possible. It was observed that the same reagent always produced coagulations of identical structure. Thus, with some, the form taken would be that of isolated flakes, more or less fine; with others, it would consist of a species of network, the structure of which would vary according to the coagulant employed, those of a coarse nature having little tenacity, while, on the other hand, those resembling fine lace were extremely elastic.

Upon a comparison of the results produced by different reagents, it was found that coagulation of latex by means of an alkaline reagent tends to produce isolated flakes or coarse network, whilst, on the other hand, when coagulation was induced either by an acid agent, or by a neutral one (i.e., neither acid nor alkaline in its reaction) an elastic coagulum of very fine network was obtained. It is therefore concluded that the same latex is able to form coagulations of very different physical structure when treated by different coagulating agents. These differences in structure are retained after drying the coagulated rubber, and accordingly, a coagulation resembling fine network produces a very solid elastic rubber, whilst those resembling coarse network or fine flakes yield, on drying, more or less pliable cakes of rubber possessing little elasticity.

Further experiments proved, however, that on acidifying a latex, in which coagulation had been brought about in the form of isolated flakes, the detached particles slowly united, finally resulting in the formation of an elastic network, thus showing that by the addition of acid or other suitable coagulant, mistakes made at the time of coagulation can be subsequently remedied. This result is also of interest for the treatment of dried rubbers. It is in fact possible to modify the elastic properties of rubber by treatment with appropriate reagents, thus correcting faults of coagulation committed in the preparation of the rubber.



## MARKET REPORTS.

London,—July 9, 1907. 'THE WEST INDIA COMMITTEE CIRCULAR,' Messrs. KEARTON, PIPER & Co.; Messrs. E. A. DE PASS & Co., June 28, 1907; 'THE LIVERPOOL COTTON ASSOCIATION WEEKLY CIRCULAR,' July 5, 1907.

ARROWROOT—St. Vincent, 2½d. per lb.  
BALATA—Sheet, 2/3 to 2/4; block, 1/10 to 1/10½ per lb.  
BEES'-WAX—£8 5s. per cwt.  
CACAO—Trinidad, 93/- to 97/- per cwt.; Grenada, 84/- to 88/- per cwt.  
CHILLIES—Japanese, fair large red and yellowish, 19/- to 20/-; Zanzibar and Mombasa mixed, 17/6 to 20/-; Sierra Leone, 28/6 per cwt.  
COFFEE—Jamaica, 42/- to 56/-; Santos, 27/4½ per cwt.  
COPRA—West Indian, £23 to £23 10s., c.i.f. per ton.  
COTTON—West Indian, good medium, 7·85d.; West Indian Sea Island, good medium, 19d.; medium fine, 20d.; fine, 21d. per lb.  
FRUIT—  
BANANAS—Jamaica, 5/6 to 7/6 per bunch.  
PINE-APPLES—St. Michael, 1/- to 3/- each.  
GRAPE FRUIT, 15/- to 23/- per box.  
ORANGES—Jamaica, 8/- to 13/- per box.  
FUSTIC—£4 5s. to £4 15s. per ton.  
GINGER—Jamaica, good medium to bold, 90/- to 96/-; low middling, 84/- to 90/-; ordinary to good ordinary, 75/- to 82/-; ratoon, 70/- per cwt.  
HONEY—Dark to good pale, 17/- to 24/-; fair white set, 25/6 to 28/- per cwt.  
ISINGLASS—West Indian lump, 1/8 to 1/10 per lb.  
LIME JUICE—Raw, 1/2 to 1/5 per gallon; concentrated, £25 per cask of 108 gallons; Distilled Oil, 3/1 to 3/2 per lb.; hand pressed, 4/3 to 4/6 per lb.  
LOGWOOD—Jamaica, £5 7s. 6d. per ton.  
MACE—West Indian fair palish, 1/4 to 1/5; pale and fair palish, 1/4 to 1/5; pale and reddish, 1/3 to 1/4; fair and good red, 1/2 to 1/4; broken, 1/- to 1/2 per lb.  
NUTMEGS—58's, 1/9; 65's, 1/2 to 1/4; 66's, 1/2; 67's to 69's, 9d. to 9½d.; 75's, 8½d. to 9d.; 76's, 8d. to 9d.; 77's to 83's, 8d.; 84's to 88's, 7½d. to 8d.; 90's, 7d.; 101's to 148's, 5d. to 5¾d.; 150's, 4¾d. per lb.  
PIMENTO—Fair, 2¾d. per lb.  
RUBBER—Black sheet, 4s. per lb.  
RUM—Jamaica, common 2/7; good to fine, 3/- to 8/-; Demerara, 1/0½ to 1/2½ per proof gallon.  
SUGAR—Crystals, 16/6 to 18/6; Muscovado, Barbados, 10/- to 11/-; grocery, 16/-; Molasses, 15/- to 16/- per cwt.

New York,—June 28, 1907.—Messrs. GILLESPIE BROS. & Co.

CACAO—Caracas, 18¾c. to 20c.; Grenada, 19c. to 19¼c.; Trinidad, 19½c. to 20c.; Jamaica, 17½c. to 18¾c.; Dominica, 18c. to 18½c. per lb.  
COCOA-NUTS—Jamaica, \$20·00 to \$32·00; Trinidad, \$29·00 to \$30·00 per M.  
COFFEE—Jamaica ordinary, 8c. to 8¼c.; fair to good ordinary, 8½c. to 9c.; good washed, 10½c. to 11c.; Rio No. 7, 6¾c. per lb.  
GINGER—Small to bold dark root, 15c. to 15½c.; small to bold bright, 15¾c. to 16¼c. per lb.  
GOAT SKINS—Jamaica, Antigua, and Barbados, 55c.; St. Kitt's, St. Thomas, and St. Croix, dry flint, 53c. to 55c.; heavy dry salted, 41c. to 43c. per lb.  
GRAPE FRUIT—Jamaicas, \$5·00 to \$8·00 per barrel.  
LIMES—\$5·50 to \$7·00 per barrel.  
MACE—35c. to 40c. per lb.  
NUTMEGS—75's to 80's, 15c.; 80's to 85's, 13c.; 90's to 100's, 11c.; 105's to 110's, 10½c.; broken, 7c. per lb.  
ORANGES—Jamaica, \$4·00 to \$5·00 per barrel.  
PIMENTO—5½c. per lb.

SUGAR—Centrifugals, 96°, 3·87c. to 3·92c.; Muscovados, 89°, 3·37c. to 3·42c.; Molasses, 89°, 3·12c. to 3·17c. per lb., duty paid.

## INTER-COLONIAL MARKETS.

Barbados,—July 22, 1907.—Messrs. T. S. GARRAWAY & Co., and Messrs. JAMES A. LYNCH & Co., July 23.

ARROWROOT—St. Vincent, \$4·25 to \$4·75 per 100 lb.  
CACAO—Dominica, \$17·00 to \$18·00 per 100 lb.  
COCOA-NUTS—\$14·00 to \$18·00 per M. for husked nuts.  
COFFEE—\$10·00 to \$10·50 per 100 lb.  
HAY—\$1·50 to \$1·60 per 100 lb.  
MANURES—Nitrate of soda, \$62·00 to \$65·00; Ohlendorff's dissolved guano, \$55·00; Cotton manure, \$42·00; Cacao manure, \$42·00 and \$48·00; Sulphate of ammonia, \$72·00 to \$75·00; Sulphate of potash, \$67·00 per ton.  
MOLASSES—15c. to 15c. per gallon.  
ONIONS—Strings, \$3·00 to \$3·50 per 100 lb.  
POTATOS, ENGLISH—\$5·00 to \$6·00 per 160 lb.  
PEAS—Split, \$5·75 to \$5·90; Canada, \$3·05 to \$3·10 per bag.  
RICE—Demerara, \$5·90 to \$6·10 (180 lb.); Ballam, \$6·50 to \$6·60 per bag (190 lb.); Patna, \$3·75 to \$4·00; Rangoon, \$3·00 to \$3·10 per 100 lb.  
SUGAR—Muscovado, \$1·75 per 100 lb.

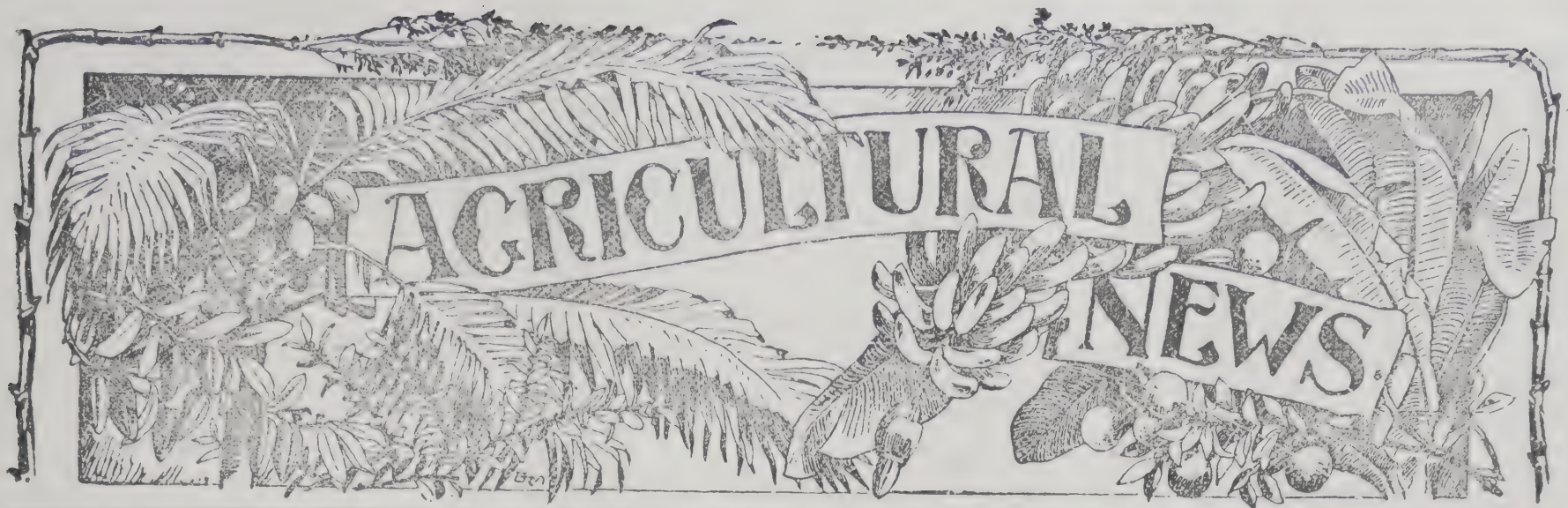
British Guiana,—July 6, 1907.—Messrs. WIETING & RICHTER.

ARROWROOT—St. Vincent, \$10·00 per barrel.  
BALATA—Venezuela block, 32c.; Demerara sheet, 48c. per lb.  
CACAO—Native, 17c. to 18c. per lb.  
CASSAVA—No stock.  
CASSAVA STARCH—\$8·00 per barrel.  
COCOA-NUTS—\$12·00 to \$16·00 per M.  
COFFEE—Creole, 14c. to 15c.; Jamaica, 13½c. per lb.  
DHAI—\$5·50 per bag of 168 lb.  
EDDOS—\$1·20 to \$1·56 per barrel.  
MOLASSES—16c. per gallon.  
ONIONS—Tenerife, 4c. to 4½c. per lb.  
PLANTAINS—20c. to 48c. per bunch.  
POTATOS, ENGLISH—Nova Scotia, \$5·00 per barrel.  
POTATOS, SWEET—Barbados, \$2·00; Creole, \$1·32 to \$1·44 per bag.  
RICE—Ballam, \$6·50 per 177 lb.; Creole, \$5·50 per bag (ex store); Seeta, \$5·50 to \$6·00 per bag.  
SPLIT PEAS—\$5·90 per bag (210 lb.).  
TANNIAS—\$2·16 per bag.  
YAMS—White, \$3·00; Buck, \$3·00 per bag.  
SUGAR—Dark crystals, \$2·50 to \$2·55; Yellow, \$2·90 to \$3·10; White, \$3·60 to \$4·00; Molasses, \$2·00 to \$2·20 per 100 lb. (retail).  
TIMBER—Greenheart, 32c. to 55c. per cubic foot.  
WALLABA SHINGLES—\$3·50 to \$5·50 per M.

Trinidad,—July 6, 1907.—Messrs. GORDON, GRANT & Co.

CACAO—\$19·00 to \$19·50 per bag, (110 lb.); Venezuelan, \$19·25 to \$19·75 per fanega.  
COCOA-NUTS—\$21·00 to \$22·00 per M., f.o.b.  
COCOA-NUT OIL—\$1·15 per Imperial gallon (cask included).  
COFFEE—Venezuelan, 8c. to 8½c. per lb.  
COPRA—\$4·15 to \$4·25 per 100 lb.  
DHAI—\$4·45 to \$4·70 per 2-bushel bag.  
ONIONS—\$4·00 to \$4·50 per 100 lb. (retail).  
POTATOS, ENGLISH—\$2·00 to \$3·00 per 100 lb.  
RICE—Yellow, \$5·60 to \$6·00; White, \$5·75 to \$6·00 per bag.  
SPLIT PEAS—\$5·50 to \$5·60 per bag.  
SUGAR—Grocery grades, \$2·00 to \$2·50 per 100 lb.





## A FORTNIGHTLY REVIEW OF THE IMPERIAL DEPARTMENT OF AGRICULTURE FOR THE WEST INDIES.

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BARBADOS, AUGUST 10, 1907.

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in the interests of that Colony it would be distinctly of advantage to it if a successful Agricultural Conference could be held there in January next. It is hoped that the sister Colonies will be willing, even at some inconvenience to themselves, to send delegates to such a Conference in order to assist in restoring confidence there.

The earthquake, as is well known, seriously affected only a small area in and around Kingston. Outside Kingston, Jamaica may still be regarded as offering distinct advantages to visitors from northern climates who wish to escape the rigours of the winter months. It may be borne in mind that visitors to Jamaica also extend their travels to Trinidad, Barbados, Dominica, and the other islands, so that in this matter of assisting Jamaica all parts of the West Indies would be more or less benefited.

The following report of a meeting of the Board of Management of the Jamaica Agricultural Society, held on July 18, contains particulars of the position in regard to holding the next West Indian Agricultural Conference in that island. The Secretary of the Society read the following letter he had received from the Colonial Secretary, dated July 13 :—

‘I am directed by the Governor to state for the information of the Board of Management of the Jamaica Agricultural Society that the Imperial Commissioner of Agriculture for the West Indies has addressed a communication to his Excellency on the subject of the place of meeting of the next Agricultural Conference.

‘Sir Daniel Morris states that when Sir Alfred Jones, the members of his party, and the delegates to

### Agricultural Conference, 1908.

**A**LTHOUGH some time must necessarily elapse before arrangements for the next West Indian Agricultural Conference can be fully brought under consideration, it may be useful to place on record the proposals that are now in hand, in that direction, at Jamaica. There is no doubt that



the last Agricultural Conference, were returning from Jamaica after the earthquake, a general feeling was expressed that with the view of restoring confidence amongst tourists and others, it would be desirable to hold another Conference in Jamaica, and Sir Alfred Jones obtained a pledge from Lord Dudley and others that, if he would make the necessary arrangements, they would come out with him. Sir D. Morris states that Captain Owen, Superintendent at Barbados of the Royal Mail Company, is also favourable to the idea, and believes the holding here of the Conference would be likely to prove most useful in restoring confidence in the island amongst people in the United Kingdom, the United States of America, and Canada.

'Sir Daniel Morris undertakes, if the Government and people of Jamaica desire that the next Conference should be held here, and are prepared to join heartily in it, to take the matter in hand, and do the best on his part to make it a success. He suggested that if Kingston is not considered a suitable place for the Conference to meet, Port Antonio or Mandeville might be found convenient.

'The Imperial Commissioner proposes going to Canada early next month, and explains that the time is now approaching when he must begin making arrangements for the next Conference. He would be glad, therefore, to learn as soon as possible the views of the leading agriculturists and of the Government of the island on the question whether the next Conference could conveniently be held in Jamaica.

'Under these circumstances, his Excellency invites an expression of the opinions of the members of the Board as early as possible. His Excellency is himself strongly of opinion that everything possible should be done to further the proposal, and he would desire to be able to inform Sir Daniel Morris that the Government and the Jamaica Agricultural Society will do all in their power to render it a success.'

The President (Sir Sydney Olivier) said if £100 would be sufficient to defray the cost of entertaining the visitors he would guarantee that the amount would be found by the Government. His own impression was that it would be well to hold the Conference at Mandeville. The delegates would thus see more of the island. The physical surroundings of Mandeville would be interesting to them, and it would be a pleasant place to stay at when they were out of the Conference room.

On the motion of Mr. Walcott, seconded by Mr. Simmonds, it was agreed that his Excellency the

Governor should send a telegram to Sir Daniel Morris saying that the Jamaica Agricultural Society and the Government desire that the next West Indian Agricultural Conference should be held in Jamaica during the coming winter, and that they were prepared to do their best to make it a success.

The Secretary suggested that it would be well if the Kendal Agricultural show was held at the same time as the Conference.

The President said he should like the Conference to be held in connexion with the show if possible. He thought the idea was a capital one. He was sure that the Mandeville people would postpone their show, which was generally held in November, to wait for the Conference. It would be an additional attraction to the Conference if the show was held at Kendal at the same time.

After further discussion, the President said he took it that Mandeville was considered the most suitable place for holding the Conference, and he would accordingly telegraph to Sir Daniel Morris.

The Secretary was also instructed to put himself into communication with the Secretary of the Kendal Show Committee, and inform him of what was likely to be done in the matter of the Conference, so that the Committee might have an opportunity to arrange for holding the show at the same time as the Conference was being held.

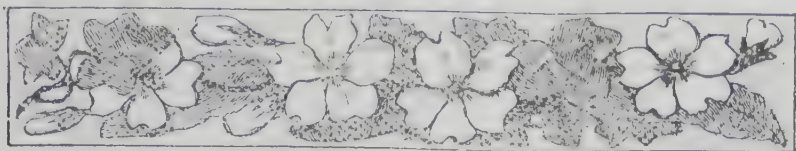
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## WILD RUBBER AND PLANTATION RUBBER.

Although there is great activity in rubber-planting circles just now, yet, as pointed out in the following extract from the *India Rubber Journal* of May 6 last, wild rubber trees will have to be regarded as the principal source of supply for several years to come:—

Much interest is being displayed in the active and prospective rubber-producing areas in various parts of the world, and several exaggerated ideas appear to be current regarding the developments which are taking place and their ultimate effects. At a recent meeting before the Society of Arts, it was pointed out that the sources of wild rubber are receiving much more consideration and care than was the case a few years ago, and may for some time be expected to supply annually the equivalent of approximately 1,000,000 acres of plantation rubber; should the supply from wild sources become scarce, it would be impossible for the plantations to supply the balance for many years to come, as the producing capacity of the land now alienated for rubber in the East will only be, in 1912 or 1913, some 12,500 to 25,000 tons per year. Wild rubber may confidently be regarded as the principal source for the next half-score of years, for the simple reason that plantations, in the proper sense, do not exist to produce what will be required.





## SUGAR INDUSTRY.

### Sugar Industry in Antigua.

A recent issue of the *Demerara Chronicle* contained an article which, starting from the fact that the financial statement of Antigua, at the end of 1905-7, disclosed a deficit of £4,667 on the year's revenue and expenditure, discussed the condition and prospects of affairs in that island. The *Chronicle* points out that cotton growing is making headway; that something is being done in the matter of pine-apple cultivation, that much more fruit and vegetables are now grown for local consumption than was formerly the case, and that a central sugar factory has been established. The following remarks on the suitability of Antigua as a sugar-producing island are extracted:—

It has been estimated that by the continued general use of the muscovado process throughout the island, a total loss, at 'a moderate computation,' of between £50,000 and £60,000 a year has been sustained. As a sugar-producing centre Antigua has many advantages in its favour, given only up-to-date methods of production. That the industry should have struggled on so long, with appliances that 'have undergone little change during the last two hundred years'—with methods that are 'unsatisfactory and wasteful in the extreme'—is in itself, no feeble testimony to the favourable natural conditions that govern the cultivation of the cane in Antigua. Labour in the island 'is plentiful and fairly efficient.' The soil is very retentive of moisture—an important quality in a colony with a precarious rainfall—and responds readily to tillage and manures. We have no reason, therefore, to doubt the soundness of the *obiter dicta* once uttered by Dr. Watts, that 'by the introduction of good machinery and proper manufacturing processes, sugar could probably be produced at cheaper rates than in any other part of the world,' and that sugar production 'would be remunerative in Antigua when prices have fallen below the cost of production in all other countries.'

The sugar interests in the island have been very slow in bringing themselves into line with modern processes of sugar manufacture, though perhaps they are scarcely to be blamed for this, so straitened have been their financial resources in recent years. A beginning has been made, however, with a central factory controlled on a co-operative basis, and there is no lack of confidence on the part of the management as to its future success.

### Cane and Beet Sugar.

The recently published number of the *Sugar Beet Scientific Quarterly* contains the following particulars relating to the production and consumption of cane sugar and beet sugar respectively:—

During the Spanish-American war the Cuban cane crop fell off, and, as a result of decreased cultivation, cane sugar then represented 35 per cent. only of the world's sugar production. It is now 41 per cent., and before another decade, it will represent at least one-half of the world's sugar

production. If the Cuban crop is actually 1,500,000 tons, it will mean a very important advance over previous years.

The world's sugar consumption may be said to have reached its maximum during the years 1905 and 1906, it being then about 12,000,000 tons per annum. Ten years previous to this, in 1896, it was 7,000,000 tons per annum. The demand apparently has not yet reached its highest level. It must be remembered that during this interval the world's population has also increased. The average consumption per head in Europe and North America was about 37½ lb. in 1903-4. The following year it fell to 35¼ lb. The highest average consumption was reached in Great Britain in 1902-3, it having been 86 lb. per head.

The price reached its lowest point in 1901-2, when beet sugar was actually selling at a loss. It is unlikely that sugar will ever again reach the prices of twenty years ago, as the improvements in the cane-sugar manufacturing methods will necessarily influence the price on the world's market in a very important measure.

Under existing conditions, cane sugar in tropical countries, with cheap labour, will continue to be made at a lower price than beet sugar in northern latitudes. One fact, however, always remains in favour of beet sugar: it can be placed on the market about one month sooner than cane sugar, and thus profit by the rise in price when the stock is low. When the stock in reserve is exceptionally large, neither cane nor beet sugar manufacturers can do much more than cover expenses.

### Labour in Demerara.

The following details relating to the difficulty experienced by sugar planters in Demerara in obtaining a satisfactory supply of labour, are taken from the *Demerara Argosy* of June 27:—

To those who have to employ agricultural labourers in this colony, it is astonishing to hear that there is a single unemployed labourer willing to work, and capable of working, who cannot find remunerative employment. The scarcity and unreliability of the local labour supply renders it impossible to establish minor industries, such, for instance, as the suggested banana industry, on a paying basis. So difficult has it become on many sugar estates to obtain the necessary supply of labour that a three months' contract is being offered to cane-cutters on the following terms.

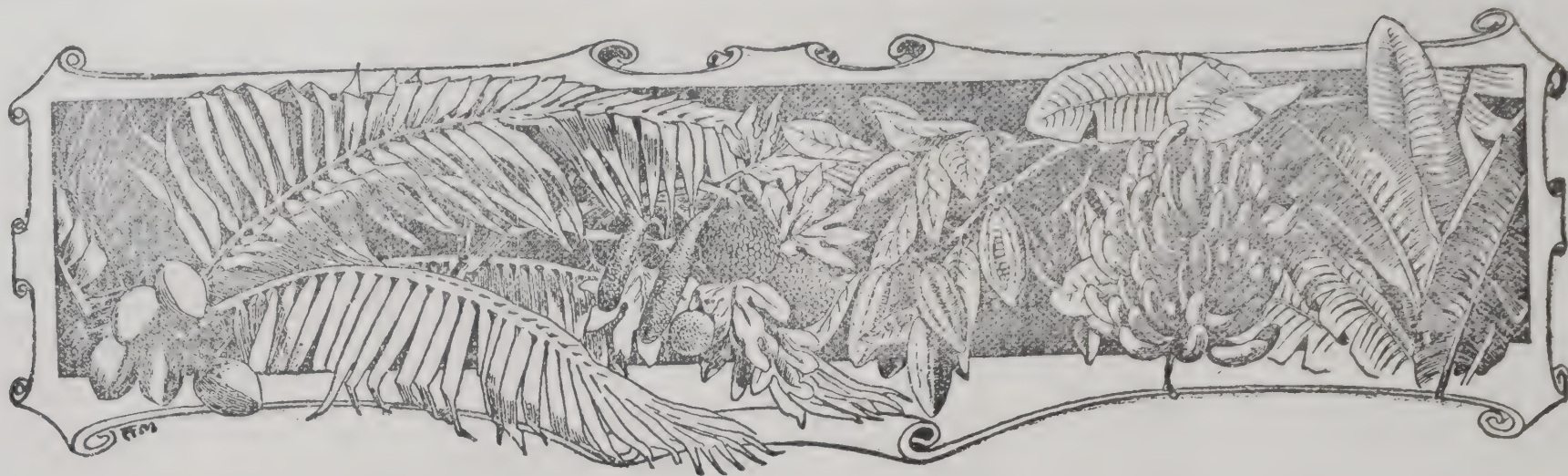
The employer guarantees:

1. Steady work during three months.
2. Medical attendance and medicines if required.
3. Payment for cane-cutting at the rate of \$3·00 per ton sugar made.
4. A bonus of 10 per cent. on total earnings if the labourer completes the contract.

The only obligation on the part of labourer is that he shall agree to work five days per week, unless prevented by illness. At the rate of pay offered, any able-bodied labourer can earn 72c. per working day of eight hours. The offer as above set forth has been made to a large number of labourers, but so far not a single man has accepted. Hundreds can be given regular and steady employment.

It would appear that the black labourers in the country districts are steadily decreasing in number. Many have no doubt migrated to Georgetown, where they help to swell the gangs of idle loafers, but it is an open question whether the gold industry has not had its effect by largely increasing the death-rate.





## WEST INDIAN FRUIT.

### VARIETIES OF ORANGES.

In an article with the above heading which appears in the June number of the *Cuba Review*, the writer discusses the qualities of the innumerable varieties of oranges that are cultivated, and also the different methods of procedure a grower might adopt in order to secure the best return for his produce.

The close resemblance that different varieties of oranges bear to one other is remarked upon, but it is pointed out that practically all known varieties may be conveniently arranged into four broad groups, possessing certain characteristics.

The first group noticed is the 'Spanish Orange' group, found throughout Florida, Cuba and elsewhere. These varieties are strong growers, make satisfactory trees, and include such kinds as Boone's Early, Magnum Bonum, Madam Vinous, Nonpareil, and Parson Brown.

To the second, or 'Mediterranean Orange' group, belong such varieties as the Jaffa, Majorca, and Maltese Oval, while the Pine-apple and Hart's Late varieties are also best included here. The trees are compact growers, almost thornless, and possess an abundance of leaves. The fruit is very rich, juicy, and of the highest quality, with few seeds.

The 'Blood Orange' group is next described. The varieties composing it very closely resemble those of the 'Mediterranean' group, the main difference being that in the case of the 'Blood' oranges, the pulp of the fruit, when fully ripe, becomes dark blood-red in colour. The quality of the oranges of this group is unsurpassed, and the fruit generally contains few seeds. To this group belong the varieties Ruby, St. Michael's Blood, and Maltese Blood.

The final group is that of the 'Navel' oranges, so called because of the umbilical marking at the apex of the fruit. The trees are strong growers, and almost thornless; the fruit is large, heavy, usually seedless, meaty, and of excellent quality, but not equal to that of the 'Blood' oranges. Of this group, the Washington Navel is the most generally planted, and the most important variety, and it is largely grown in the West Indies.

The number of different varieties to be grown is next discussed, and the question is considered from the point of view of the commercial planter, who is looking for a good financial return. It is pointed out that the grower may either concentrate his attention on one or two early, or on one or two late varieties, and ship the bulk of his produce to meet the market at either of these periods, when prices are at their best, because the markets are undersupplied when these varieties are ripe; or, on the other hand,

especially if he be a large planter, he may desire to start his shipments early, and continue throughout the season. The balance of evidence, it is stated, appears to be in favour of the continuous shipment plan, and no doubt the grower who plants his orange grove with varieties which will enable him to ship from the beginning of the season right through to the end of it, is pursuing a wise policy.

The question as to the best varieties of oranges to select for early, for continuous, and for late planting respectively, is next considered. It is laid down that for very early, and early oranges the best varieties are Boone's Early, Nonpareil, and Parson Brown; while good midseason varieties are Magnum Bonum, Homosassa, and Madam Vinous (these latter three being all Spanish varieties). For the production of medium late and very late oranges, Pine-apple, Jaffa, Ruby, Hart's Late, and Valencia Late are recommended.

Of the 'Navel Oranges' the Washington Navel, naturally, has been more grown and tested than any of the others. In Florida, where it had not proved so satisfactory, its prolificacy has been largely increased by budding it on rough lemon stocks. The writer of the article concludes by advising Cuban orange growers to adopt this same method of propagating the variety, and to plant it only in comparatively limited numbers at first, until its suitability has been tested; but he adds that if the Washington Navel proves satisfactory in Cuba, it would have no superior as a variety for shipment during December and January, for it is large, handsome, bright, full of juice, and meaty.

### COLONIAL FRUIT EXHIBITION IN LONDON.

The Secretary of the West Indian Committee writes as follows in regard to an Exhibition of Colonial Fruit to be held in London under the auspices of the Royal Horticultural Society in November next:—

You will note from the *Circular* that there is to be an exhibition at the Horticultural Hall on November 28 and 29 next. I think it would be very desirable for the Permanent Exhibition Committees in the several Colonies to participate in these exhibitions, though in the event of their deciding to do so, it would, I think, be well to make some arrangements with the Royal Horticultural Society by which they could be well advertised.



## BANANA PRODUCTION IN COSTA RICA.

From an article dealing with the conditions and prospects at present prevailing in Costa Rica, which appeared in the May number of the *Monthly Bulletin* of the International Bureau of the American Republics, the following information relating to the banana industry of the Republic is extracted:—

In Costa Rica the banana grows all the year round. The shoots begin to produce at the age of nine months, and they are cut down every season. The banana bunches are measured by hands, and each perfect hand has twenty-two bananas. The average number of hands on a bunch ranges from seven to twenty-two. The average number of bananas on a bunch is 144, though a few bunches have been found with upward of 500.

The land along this coast is peculiarly adapted to banana raising. While the banana trees thrive for awhile in other countries of Central America, no soil seemed rich enough to stand the continuous cultivation of the fruit save Costa Rica and Upper Panama. Land can be bought here at \$12 per acre. It costs \$40 per acre to clear it, and put it into condition to raise bananas. It will yield fifteen bunches of bananas per acre every month. Taking the average of 144 bananas to the bunch, it will be seen that each acre will produce 15,920 bananas. The vegetation is so rank, and its growth so rapid, that it takes one man to every 3 acres to clear the brush and grass every four months, pick the fruit, dig the ditches, build the bridges, and do all the necessary work. Farm labourers are paid from 85c. to \$1.50 per day, American money. The labourers can live luxuriously on these wages if they choose.

The United Fruit Company owns 150,000 acres of land susceptible of banana culture. The greater portion of this, remote from the railroad, is not yet used for the production of bananas. Last year the Company purchased about half the bananas it shipped. Many banana-growers own their own farms. During 1906, no less than 8,500,000 bunches were shipped from Port Limon, of which 5,000,000 bunches went to the United States. There is no export duty on bananas. [A small duty of 1 cent. per bunch however has just been levied.] About 400 ships, or on an average of more than one ship per day, loaded with bananas, left Port Limon last year.

This year, it is confidently believed, 10,000,000 bunches will be exported. A ship of 3,000 tons sometimes takes from 40,000 to 50,000 bunches. While the Jamaica bananas are pronounced better by epicures, the Costa Rica or Limon bananas sell better in the market because they look better. They have a fine appearance, and four customers out of five will choose them. A good many settlers have come here from the United States, and have been very successful in banana raising.

It is said broadly that everything will grow in Costa Rica. By far the larger part of the population live on the Pacific side of the mountains; yet nine-tenths of all the exports are from Port Limon. Sixty-five per cent. of these exports go to the United States. While bananas are the principal export, still last year the value of coffee exported was \$3,350,000.

Thirty-two thousand bunches or over 4,600,000 bananas, are about an average load. If one considers that the United Fruit Company has 102 ships carrying fruit to the United States and Europe, he gets a faint idea of the tremendous growth of the business. Of course, many of the ships ply from Cuba, Jamaica and other fruit-producing countries to ports of the United States and England. This company gives work to no less than 7,000 persons.

## CITRATE OF LIME.

In continuation of the information on the subject of the preparation of citrate of lime, as compared with concentrated juice, published in the *Agricultural News* (Vol. VI, p. 213), the following copy of a letter received from Messrs. Sydney Harvey & Co., 48, Mark Lane, London, E. C., is of interest, as confirming the opinion expressed by the Powers-Weightman-Rosengarten Company, of Philadelphia, viz., that buyers generally will purchase citrate of lime in preference to concentrated juice; also that a higher price is paid for citrate than for juice:—

*Messrs. Sydney Harvey & Co., 48, Mark Lane, London, E. C.  
—to the Imperial Commissioner of Agriculture  
for the West Indies.*

With further reference to your favour of June 3, we beg to say: Citrate of lime is preferred to concentrated juice by our acid makers, because the former is more easily worked, and is altogether a more satisfactory article to deal with, and, to the producer himself, citrate of lime is also a better article. In the first place, a higher price is paid for citrate of lime than for juice, and there is a considerable saving in freight, casks, and loss by leakage. Up till a few years ago, the whole of the Sicilian production was in concentrated juice, but when the makers once realized how much more satisfactory citrate of lime was, the making of concentrated juice ceased entirely, and now we receive from Sicily something like 5,000 tons of citrate of lime.

There is no chance whatever of the demand for citrate of lime falling off and returning to concentrated juice. We believe that more citric acid can be saved in making citrate than in concentrating juice.

We are glad to hear that there is a good prospect of the limes being cultivated over a larger area, as the consumption of citric acid is steadily increasing in America and Europe, and we do not expect there will be any difficulty in disposing, at good prices, of considerably larger quantities of citrate of lime than there are at present available.

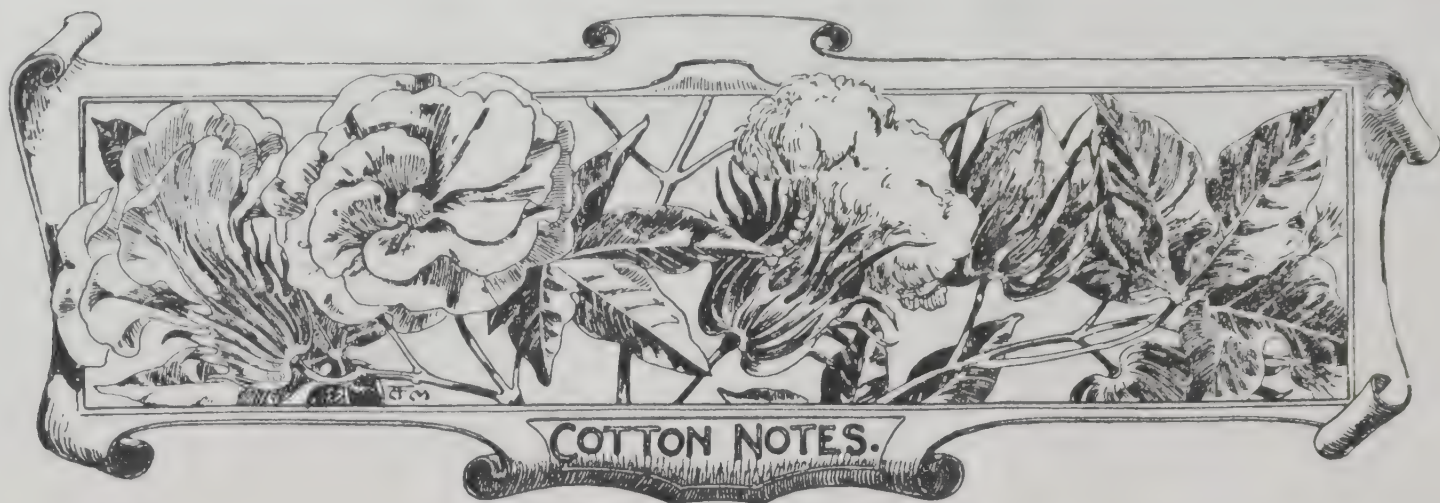
If any of the planters or makers would like to correspond with us, we shall be pleased to give them all the information in our power, and in case of need, to sell their produce for them to the makers of the acid, not only in England, but in other countries also.

We do not wish you to treat this letter as confidential, as our only object is to assist in the increase of the manufacture of citrate of lime in our own colonies, which certainly ought to reap much of the benefit that has hitherto gone into the pocket of the Sicilians. There is no reason why the British West Indies should not supply the greater part of the wants of citric acid makers, which average about 6,000 tons of citrate a year, of the value of over half a million sterling.

Besides the return from making citrate, there is of course, a substantial benefit from the essential oil extracted

In a recent bulletin, Mr. Hart, the Superintendent of the Botanic Gardens, Trinidad, states that the crop of seeds harvested from a large rubber tree there, numbered over 4,000, which gave to the nurseries a supply of fine, healthy plants. It is further mentioned that Trinidad has now reached a stage in rubber production when shipments of 1,000 lb. at a time are made. Lots of *Castilloa* sheets have been sold at the rate of 4s. 3d. and 3s. 4d. per lb., respectively, from two estates, while on one estate scrap rubber has sold at 3s. 3d. per lb.





### COTTON PROSPECTS IN THE SEA ISLANDS.

The Sea Island Cotton Report of Messrs. Henry W. Frost & Co., of Charleston, dated July 13, 1907, contains the following note :—

Under the effects of good weather, the crop has continued to improve, and although still backward, is in a healthy condition, and growing well.

They report, on July 20 :—

Our crop advices continue favourable, and with the exception of being still backward, the crop is reported to be making good progress.

### WEST INDIAN COTTON EXPORTS.

The estimated value of cotton lint exported from the various West India Islands for the *nine months* from October 1, 1906, to June 30, 1907, is as follows :— December quarter, 1906, £12,024; March quarter, 1907, £86,145; June quarter, 1907, £68,831; total £167,000.

If the value of the seed is also taken into consideration, the total value of lint and seed would probably amount to £200,000. It is not improbable that next year (1907-8) the total value of the cotton lint and seed exported from these Colonies will exceed a quarter of a million sterling.

### WEST INDIAN COTTON.

Messrs. Wolstenholme & Holland, of Liverpool, write as follows, under date of July 22, with reference to the sales of West Indian Sea Island cotton :—

We have had a fair inquiry for West Indian Sea Island cotton since our last report, and we have maintained present values with difficulty, owing to the independent position of the consumers, the majority of whom have stocks carrying them well into next year, while the American Sea Island crop will commence to arrive in October and November, and lower prices are confidently expected. The weather has been so unseasonable in Europe this summer that large quantities of the finest goods have been carried over by the leading warehouses into the next season, and consequently spinners expect less demand for their production.

The sales comprise Barbados, 22*d.* to 23*d.*; St. Martin, 17*d.* to 19*d.*; Nevis, 18*d.* to 22*d.*; Antigua, 22*d.* to 22½*d.*; Montserrat, 16*d.* to 22*d.*; St. Croix, 21*d.* to 22*d.*; St. Kitt's 17½*d.* to 22*d.*; and St. Vincent, 18*d.* to 23*d.*; including a quantity of stains at 7*d.* to 14*d.*

### SEASONABLE NOTES.

During the early stages of growth the young cotton plants should receive very careful treatment, for if well attended to during these early days, the progress they make is more rapid, and they are more likely to grow into strong, healthy plants.

For some time the growth above ground is very slow, but at this period the root system is developing rapidly, the degree of growth, however, varying according to the condition of the soil, a well prepared soil always facilitating the growth more than one which has been neglected. The advisability of encouraging this early root development is easily recognized, for the sooner a good root system is well established, the sooner the plants are in a position to withstand unfavourable atmospheric conditions, and the more abundant is the supply of food elements from the soil to the parts above ground.

With a view of assisting the plant to develop a good root system, the surface soil should not be allowed to become hard and baked. When the plants are about 8 inches high, they should be moulded up for the first time, as this prevents them from being tossed about by the wind. Further, a good surface of loose earth is formed around the plants which protects the soil in which the young roots are forming. In this way more moisture is retained in the soil, and the roots are placed at a greater depth below the surface. The effect of this treatment is seen after a few days in the more healthy and vigorous appearance of the young plants.

Later on, when the plants are from 12 to 16 inches high, they should again be moulded up.

### FIRST AND SECOND PICKING COTTON.

The relative qualities of cotton lint from the first and second pickings have lately been investigated by the Imperial Department of Agriculture. A number of samples of the first and second pickings from the same plants have been obtained from the parish of St. Philip. The lint in each case has been carefully compared, and the differences are such as would indicate that cotton from the first and second pickings should, if possible, not be mixed together. The cotton of the first picking is longer, finer, and has a better lustre and natural twist. First picking cotton however, is subject to one drawback, and that is the occurrence of a larger proportion of weak fibres. The second picking cotton, while it contains a lower proportion of weak fibre, appears to be lacking in some of the good qualities of the first picking, and is more brittle.



## COTTON SEED SELECTION.

The accompanying illustration of four cotton seeds with the lint attached will prove of interest to cotton planters, as showing the variation in the length of the lint taken from plants growing in the same field.

This variation is found in almost every cotton field. Although the lint produced by different seeds of individual plants will exhibit a certain amount of variation, yet this never exists in such a marked degree as that which is often seen in samples of lint produced by separate plants.

The seeds used to plant the field from which the samples illustrated were obtained were hand picked, and supplied in the usual course through this Department. The field was situated

shows what great variation occurs in the length of the staple on plants growing in the same field. This is also likely to be associated with other qualities, such as variation in fineness, silkiness, and strength.

How to remedy the defect in uniformity has been carefully studied by the Imperial Department of Agriculture, and it is expected that great improvement will arise by using seed from plants which have produced the most uniform quality of lint.

Under ordinary conditions, when the planter selects his seed after the cotton has been ginned, it is impossible to discriminate between the seeds which have produced long and short lint respectively, with the result that it is just as likely that seeds such as the two lower ones shown in the

illustration may be used for planting, as that seeds similar to the two upper ones may be selected. The inadvisability of this is easily understood, for the chances are that the lower seeds would produce plants bearing short lint and that the upper seeds would produce plants with long lint.

The method mentioned above of hand picking the seeds obtained from fields that have produced a good average quality had its value, and for the time, it was the best that could be done. Since then special seed selection experiments have been started by the Department Officers in the various islands, and these are expected to remedy the defects of the method above referred to.

In these new experiments the first selection is made in the field where the individual plants are carefully examined as regards health and prolificness, and no plant is further considered unless satisfactory in these respects. The strong, healthy, prolific plants are next examined for the quality of the lint they produce, and if this is found to be above the average quality in uniformity, length, lustre and strength, such plants are specially marked, and all the seed-cotton produced by them is collected by itself and subjected to a further examination.

The seed-cotton collected from the selected individual plants on several estates is then carefully examined and compared, and the best sample, or samples, is finally selected, and all the inferior ones rejected.

By steadily adopting this method of selection, it is anticipated that the very best seed is obtained, capable of producing the best qualities of good all-round lint. There is thus absolute control of the seed, and its origin is always known.

The quantity of seed which can be obtained by such means is necessarily very small; but by planting it in nurseries and resowing at once, the seed obtained from a single plant can be multiplied in a single season so as to supply sufficient seed to plant 20 acres.

This selection could be continuously carried on, so that every year a fresh nursery is established with seed from the best plants of the previous year.

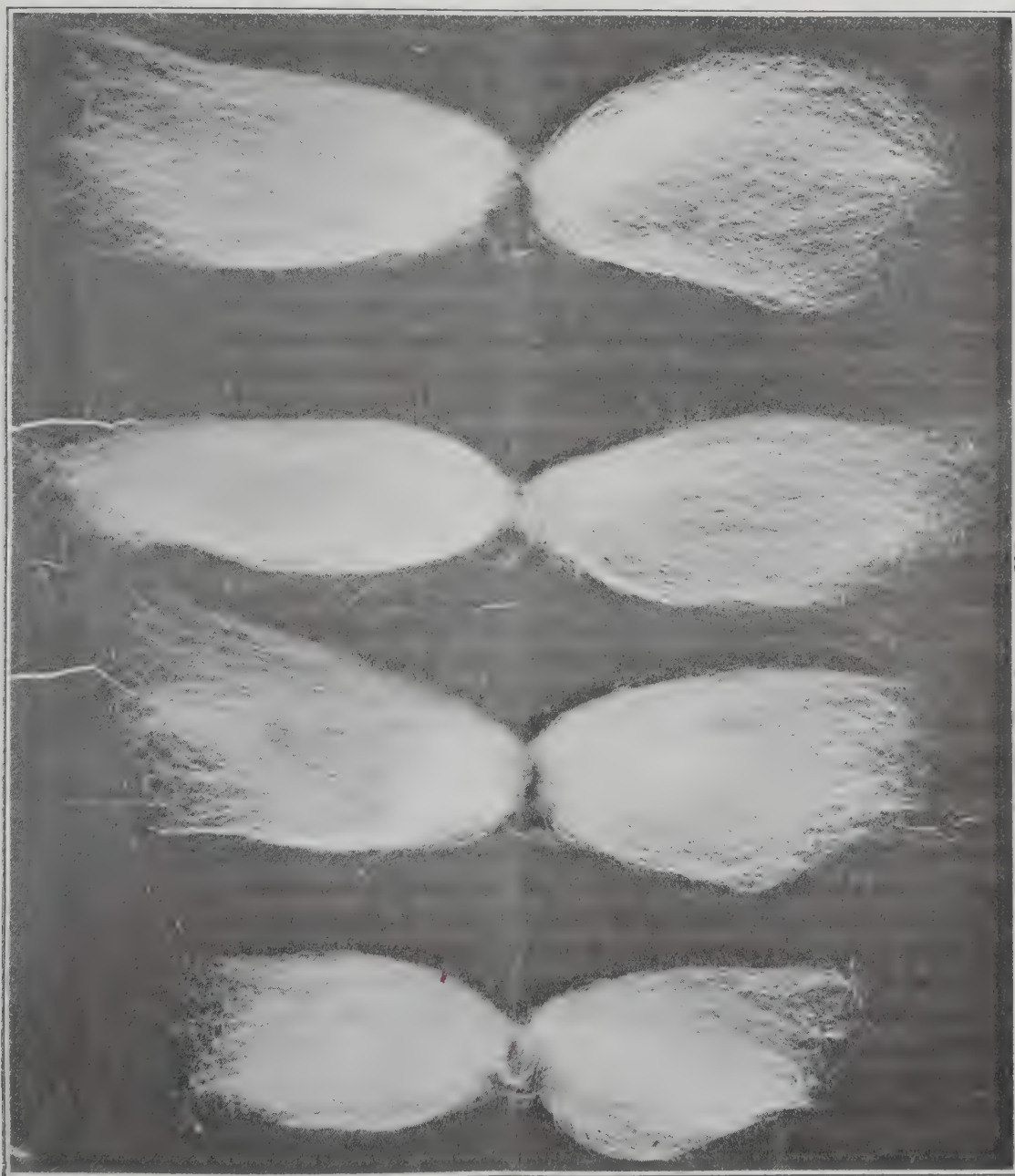


FIG. 17. SHOWING VARIATION IN LENGTH OF LINT FROM COTTON PLANTS ALL GROWING IN THE SAME FIELD.

in a northern parish of Barbados, and in a district which had not yet been successful in growing good cotton. The same variation, however, has been observed in other localities, hence the characters shown in the illustration are deserving of general attention.

Carefulness, even to the smallest details, is of importance in the case of Sea Island cotton, as the uniform character of the lint is a chief point to be aimed at. The illustration



## EDITORIAL NOTICES.

Letters and matter for publication as well as all specimens for naming, should be addressed to the Commissioner, Imperial Department of Agriculture, Barbados.

All applications for Copies of the 'Agricultural News' should be addressed to the Agents, and not to the Department.

*Local Agents:* Messrs. Bowen & Sons, Bridgetown, Barbados. *London Agents:* Messrs. Dulau & Co., 37, Soho Square, W., and The West India Committee, 15, Seething Lane, E.C. A complete list of Agents will be found on page 3 of the cover.

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# Agricultural News

VOL. VI. SATURDAY, AUGUST 10, 1907. No. 138.

## NOTES AND COMMENTS.

### Contents of Present Issue.

In the editorial will be found particulars of the present position with regard to holding the next West Indian Agricultural Conference at Jamaica.

On page 243 the position of affairs in Antigua is touched upon, with special reference to the growing of sugar. The relative consumption of cane and beet sugar is discussed, and there is a note on the present condition of the labour market in Demerara.

Under West Indian fruit, information is given with regard to the best varieties of oranges to grow for the market. There is also an article on banana growing in Costa Rica.

Cotton Notes (pp. 246-7) include an interesting and illustrated article on Cotton seed Selection, as well as Seasonable Notes, etc.

The relative value and cost of Paris green and London purple are discussed under Insect Notes, on p. 250.

On page 251 will be found the results of an egg-laying contest, as well as two articles in connexion with rubber growing.

The beneficial effects upon soil conditions caused by shading are described in an article on p. 254, and on the following page is an interesting article on cacao cultivation in West Africa.

### Rubber from a Tuber.

A plant has been discovered in Portuguese West Africa, possessing a fleshy, tuberous, turnip-shaped root, the entire substance of which is permeated with laticiferous ducts, that yield a supply of rubber latex. The plant belongs to the natural order Asclepiadaceæ. Rubber has been obtained from the tubers by slicing them, applying pressure, and coagulating with alcohol. Tubers two years old attained a weight of nearly 1½ lb., and a rubber yield of a half of 1 per cent. of the total weight. Professor Gerales of Lisbon, who reports on the plant, regards as possible the production of over 180 lb. of rubber per acre at the end of two years.

It may be mentioned that the term 'potato rubber' formerly sometimes used in the trade, did not, as some suppose, relate to rubber obtained from a tuber, but merely to the appearance of the small balls in which certain rubbers came to market.

### Preservation of Kola Nuts.

In reference to the above subject (*Agricultural News*, Vol. VI, p. 191), a French writer, in an article contained in a recent number of the *Répertoire*, maintains that the best method of preservation of kola nuts is to beat the fresh nuts to a pulp with an equal weight of lump sugar. This method is not only simpler and more economical than any other, but the product contains all the constituents of the nuts in an unaltered condition. It is stated that specimens of the confection so prepared seven years ago, placed in glass jam jars, covered on top with tinfoil and tied over with paper, stored without any special precautions on the laboratory shelf, were found to have kept perfectly except for a superficial lay of mould. On exposure of this pulp to the air, it scarcely altered in four days. But on washing away the sugar with water, the kola immediately assumed the characteristic bright-red colour, indicating that the natural oxidising ferment, or oxydase, contained in the fresh nut, retained its power unimpaired.

### Agricultural Developments in British Guiana.

The Department of Mines, New Amsterdam, is stated to be receiving a good number of applications for Crown lands on the Corentyne river bordering against Dutch Guiana. Grants of this land are made to settlers at \$27.50 for 25 acres. An official of the Department informed the *Demerara Chronicle* that the settlers on these lands are going in largely for rice cultivation, and at the present time very nearly 600 acres of rice have already been planted. This official also stated that the land on the left bank of the Corentyne is most suitable for purposes of settlement, and is capable of growing cacao, as well as rubber, cocoa-nuts, and oranges. The *Demerara Chronicle* mentions the case of one settler, who has under cultivation 2,500 cacao trees, 130 cocoa-nut palms, and numerous oranges and limes. Another man owned 3,000 cacao trees and 200 rubber, besides spice, nutmeg, pepper, coffee, and fruit trees. There are also, it is stated, numerous other settlers, both negroes and East Indian coolies, now engaged in planting cacao, coffee and rice extensively.



### Agricultural Banks.

The need of an Agricultural Loan Bank in Trinidad, which should exist for the purpose of advancing small sums at a moderate interest and on the security of the season's crops, to peasant proprietors who may happen to be temporarily in need, is dwelt upon in a recent number of the *Port-of-Spain Gazette*. As pointed out in the *Agricultural News* (Vol. IV, p. 186), the assistance offered by such institutions has been of the greatest benefit to the poorer members of the agricultural community in those countries—Germany, Austria, etc. as well as in Ireland—where they have been established. A Sugar Industry Agricultural Bank was started at Barbados in the early part of this year, and the promise of success which attends it should encourage those anxious to bring into existence a similar Society in the neighbouring colony.

As mentioned in the *Gazette*, this subject received considerable attention at the Conference held under the auspices of the Imperial Department of Agriculture at Trinidad in 1905, and a pamphlet, 'Information in Regard to Agricultural Banks', (price 5d., post free 6d.), giving full particulars, has also been issued by the Department.

### Tobacco Growing in the West Indies.

Several West Indian papers have reproduced the recent remarks of Lord Winterstoke (formerly Sir W. H. Wills) in which he pointed out that although at present the English supplies of tobacco are practically all drawn from the United States, yet efforts are now being made in many parts of the British possessions which have a suitable climate, more especially in Nyassaland and the Transvaal, to produce the crop for export. Lord Winterstoke added that all the samples seen by him had more or less promise in quality of leaf, but they all showed lamentable ignorance in curing and putting up. This is the more regrettable as the best crop of leaves that can be produced may easily be spoiled by unskilful methods of curing, but with soil and climate in favour, there is no reason why producers should not apply themselves to learn the art of curing tobacco successfully.

The *West India Committee Circular*, in a recent issue, remarks that it is doubtful whether as much attention is being given to tobacco cultivation in the West Indies as might be the case, but (leaving over for the moment, the question of tobacco cultivation in Jamaica) a note in the last number of the *Quarterly Bulletin* of the Botanic Gardens, Trinidad, shows that the subject is receiving attention in this latter island. Results of experiments carried out at the Gardens at St. Clair proved that a very fine class of tobacco can be produced in Trinidad, and samples of the present year have been manufactured into cigars of high quality. It is to be hoped that the cultivation of the crop will be extended in the British West Indies, as, in the words of the *West India Committee Circular* 'the subject is an important one, and it is not unlikely that as much will be heard in the future of the necessity for British-grown tobacco as for British-grown cotton.'

### Oil Fields of Trinidad.

Under the above heading, an exhaustive general report has been issued of the geological work done on the Central and Northern Anticlines, in the Western Districts of Trinidad, by Mr. Cunningham Craig, Government Geologist. From a consideration of this report it would appear that, in spite of the general difficulties attendant upon geological work in a country covered by swamps and alluvial soil, many valuable additions to the knowledge of the geology of the island have been made as a result of Mr. Craig's investigations.

At the beginning of the report will be found details of the observations upon which he bases his general conclusions, and recommendations which should be of great use to those interested in the possibilities of Trinidad as an oil-producing country.

Among the most interesting results of Mr. Craig's observations may be mentioned the indications he gives of spots in which, from the general conformation of the surrounding strata, it would appear that boring for oil might be carried out with ease, and with every prospect of success.

The probable mode of formation of the famous Pitch Lake at La Brea is shortly discussed in the report, and this should prove of interest to students of geology.

### Prospects in Jamaica.

The *Colonizer* for July contains a special article on Jamaica, which gives a great deal of valuable information as to the prospects offered by the island to planters and stock-farmers.

It is pointed out that a settler with capital enough to combine cattle and sheep farming with fruit and other cultivation, should do well, and that properties of from 200 to 1,000 acres, with house, etc., would cost from £500 to £3,000 and upwards. The value of land, however, naturally depends largely upon its position, the fertility of the soil, and water capacity, etc.

Particulars of the prospects in connexion with fruit growing are given, and the cost of the plants, as well as of setting them out, is stated in the case of citrus fruits, bananas, and pine-apples. The climate of Jamaica, it is mentioned, is so well adapted for orange cultivation that the fruit will grow in nearly every part of the island, up to 4,000 feet elevation, and without needing much attention from the planter. In connexion with banana growing, however, it is laid down that no man should think of taking it up without experience, and that at least £2,000 would be requisite in Jamaica to purchase an estate and working stock.

The cultivation of cacao is touched upon, and it is mentioned that rubber is now being planted as a permanent shade to the cacao trees. Tobacco is also mentioned as a crop for which the soil of parts of Jamaica is well suited; the curing appears to require more care and attention than the growing. It is stated in conclusion, that a further special article will shortly appear in the *Colonizer* on the coming cotton industry of Jamaica.





## INSECT NOTES.

### London Purple.

London purple is a well-known insecticide containing arsenic. It is produced as a by-product in dye manufacture, and is therefore somewhat variable in its composition and the quantity available at a given time.

The price of London purple was formerly much lower than that of Paris green, but with the rise in price of arsenic in all forms, the price of London purple has gone up, till now it costs about as much as Paris green.

During the past season, 1906-7, London purple was used on a fairly large scale at St. Kitt's and Montserrat, and good results were reported as to its influence in controlling the cotton worm.

The price of London purple (28c. per lb.) is about 2c. per lb. less than that of Paris green (30c.), but the difference in the amount of arsenic contained in the two substances is much greater than this small difference in price would indicate.

Comparing good average samples of these substances it will be found that Paris green contains a total of arsenic compounds amounting to 56 to 60 per cent., while London purple has a total of arsenic compounds of 42 to 44 per cent. The difference in the amount of pure arsenic contained in these substances is also considerable.

For instance, 100 lb. of Paris green, of good average sample, should contain some 56 to 60 lb. of arsenic compounds, equivalent to 42 to 45 lb. of pure arsenic; but 100 lb. of London purple of equal grade would contain only about 42 to 44 lb. arsenic compounds, equal to 27 to 35 lb. of pure arsenic.

The relative cost of arsenic per lb. in the two substances is shown by the following figures: 100 lb. of Paris green at present prices (30c. per lb.), would cost \$30.00. Estimating the amount of arsenic in 100 lb. of Paris green at 42 lb., it will be seen that the arsenic costs in this form about 71c. per lb. Now considering London purple, the cost of 100 lb. at 28c. per lb. would be \$28.00. Estimating the amount of arsenic in this 100 lb. at 30 lb., the arsenic itself would cost about 93c. per lb. as against 71c. per lb. in Paris green.

Comparing the two substances in another way, it will be seen that with Paris green obtainable at 30c. per lb. it should be possible to buy London purple at from 21c. to 22c. per lb., as, at these figures, we should be paying the same price per pound of arsenic present, in each of the two substances.

Dr. Longfield Smith, B.Sc., Ph.D., Lecturer in Agricultural Science under the Imperial Department of Agriculture, will give a course of six Lectures on the Chemistry of Plants, under the auspices of the Natural History Society, at the Hall of the Barbados Free Library, at 8 o'clock on Wednesday evenings, August 7 and 28, and September 4, 11, 18 and 25. Admission free.

## DESTRUCTION OF LOVE VINE.

The following notice appears in the *Government Gazette of Grenada* for July 1, 1907:—

The Governor desires to direct the attention of the people of Grenada to the necessity of their making a sustained effort to destroy the vegetable growth known as the 'Love Vine' or, in patois, 'L'Amitié.' [It is also known as Dodder, and is a species of *Cuscuta*].

The damage done to cultivation by this vine is very great as is well known to all; and it must, if possible, be got-rid of. Its vitality is such that the smallest piece of it will grow readily, so that destruction of it, to be effective, must be complete.

The Governor especially asks all persons to impress upon their children that the practice of throwing pieces of the vine upon trees and shrubs by the roadside must be stopped, as in this way it is most rapidly spread and encouraged.

The Governor hopes that planters, peasant proprietors, and labourers will all help in destroying this dangerous weed.

## DISEASES OF COCOA-NUT PALMS.

In reference to the article in the *Agricultural News* (Vol. VI, p. 75), in which a brief summary of a report on the diseases of cocoa-nut palms in Trinidad is given for the information of cultivators of cocoa-nuts, it may be mentioned that on those estates which were suffering the most severely from root disease, (*Botryodiplodia* sp.), and on which the suggested remedial measures have been thoroughly and conscientiously carried out, there has been a marked decrease in the number of newly affected palms.

Information has been received which shows that drainage of all damp, low-lying hollows, and the careful burning of all dead or dying trees, diseased leaves, petioles, etc., during the last six months, appear to have successfully checked the spread of the disease. On some estates, all affected palms have been felled, the trunks cut into short lengths, and made into heaps over the old stumps. These were then covered with the cabbage leaves, and all inflammable material that was near at hand, and, after an interval for withering, were set on fire. Although in many cases, the whole of the trunks were not consumed, it is thought that the heat was sufficient to destroy bacteria or fungi.

The success of these remedial measures, which have proved to be more effective and economical than burying with lime, appears to have encouraged planters to consider the replanting of areas devastated by disease in 1905; but it should be mentioned that careful consideration should be given to drainage and cultivation, before replanting is undertaken. It would probably be advisable for the young plants to be put in between the old rows, so that they alternate with the old stumps.

However, it should again be stated that the adoption of remedial measures must be carried on systematically by all interested in cocoa-nut cultivation; for, by co-operation, it may be possible for planters to check the diseases, and probably to eradicate them. It should not be forgotten that undrained, uncultivated, neglected portions of any estate may be a standing menace to the whole estate, and perhaps to the whole district.



## POULTRY NOTES.

### Lessons from an Egg-Laying Contest.

A recent number of the *American Agriculturist* gives particulars of an egg-laying competition carried out a short time ago at Ryde in Australia. In this competition the laying powers of no less than sixty-nine breeds, sub-breeds, and varieties were tested against each other over a period of twelve months, each breed or variety being represented by a pen of six birds.

The records made in this competition have often been beaten, but the excellent average maintained throughout the whole contest is well worthy of being brought to the notice of poultry keepers in all parts of the world. The sixty-nine pens of birds—numbering 414 hens in all—laid a total of 72,878 eggs, an average of 176 eggs per hen throughout the year. The smallest number laid by any pen was 689, or an average of 116 for the six birds; the largest number of eggs produced was 1,232, an average of 222 per head—more than a hundred in advance of the lowest pen's average.

The leading nine pens, their records and averages were as follows: Black Orpington, total 1,332, average 222; Single-Comb White Leghorn, two pens, 1,259, average 209; and 1,232, average 206 respectively; Black Orpington, 1,221, 203; Rose-Comb Brown Leghorn, 1,211, 201; Single-Comb White Leghorn, two pens, 1,211, 201; and 1,207, 201 respectively; Rose-Comb Brown Leghorn, 1,202, 200; Single-Comb Brown Leghorn, 1,201, 200. Thus nine out of sixty-nine pens laid 200 eggs or more in the year. Ten other pens laid between 190 and 200 eggs; fourteen between 180 and 190, and ten between 170 and 180. Thus forty-three pens out of sixty-nine made averages of 170 or more. Of the remaining twenty-six pens, fourteen exceeded an average of 150 eggs.

When it is realized that more than 350 of these fowls made records of 150 to 222 eggs a year, and when it is remembered that the average record of the American farm hen, as reported in the last census, is only sixty-five, we are confronted by the conviction that there is not only ample room for improvement, but that the improvement will tend greatly to our financial advantage. Of course, the comparison made is not quite fair, because the record makers were picked fowls and the others were not. But we ask—Why not have more of such fowls? The answer is: we are having more of them. The whole country is waking up to the fact that fowls bred for business pay far better than those not bred at all, and breeders of such fowls cannot keep pace with their orders.

### FREQUENCY OF TAPPING AND AMOUNT OF RUBBER OBTAINED.

In an article which appeared in the *Agricultural Bulletin* of the Straits and Federated Malay Settlements, Messrs. H. N. Ridley and R. Derry show, as the result of observations carried out by them at Singapore, that there is much difference in the amount of rubber obtained from the same quantity of latex at different times of the year, at different times of the day (i.e., at morning and evening tappings), and from the same group of trees when they have had a sufficient interval of rest, and when they have not. The following extract, which deals with this last point, is taken from the article:—

Although in over-tapping, latex is renewed in the bark quickly, caoutchouc takes much longer to produce, though it does not seem in the worst cases ever to be entirely absent

from the latex. Thus, in a trial of the spiral method of tapping on the largest tree in the Botanical Garden there was obtained from the first period of tapping, one month afterwards, 531 fluid oz. of latex giving 9 lb. of rubber, and from the second period of tapping, one month afterwards, 433 oz. of latex, giving only 4 lb. 15 oz. of rubber, the ratios of caoutchouc to latex comparing as  $3\frac{1}{16}$  fluid oz. to 1 oz. dry rubber, as against  $5\frac{7}{16}$  fluid oz. to the same amount of rubber. It is therefore of the greatest importance to the cultivator to avoid tapping at the wrong season, when he is very liable to interfere with the special physiological processes in the trees then performing their functions. The bark of the trees does not recover as well from wounds during the resting period between December and March, nor does it appear that the return of caoutchouc is as good. Rapid and good renewal of the bark is very necessary, not only to protect the wound from injurious attacks of fungi, but to increase the production of caoutchouc. Too frequent or prolonged tapping is not only injurious, but results in a yield of latex very inferior in its rubber-producing qualities.

### RUBBER IN FRENCH WEST AFRICA.

French West Africa is particularly rich as a rubber-producing area, and the following information, taken from the last *Annual Report* of the British Consul at Dakar, as to the steps the French Government are taking to safeguard and develop these resources, indicates that rubber plantations are looked upon as likely to become valuable sources of revenue in the future:—

A special survey is being made of the chief rubber-producing districts, which will eventually be divided into three categories, as follows:—

1. Unexploited districts. These consist only of a few regions in the Ivory Coast forests.
2. Districts which are exploited, but have not been spoiled by excessive production and unscientific methods of collection.
3. Districts which have been spoiled for the above reasons. These latter are in the majority.

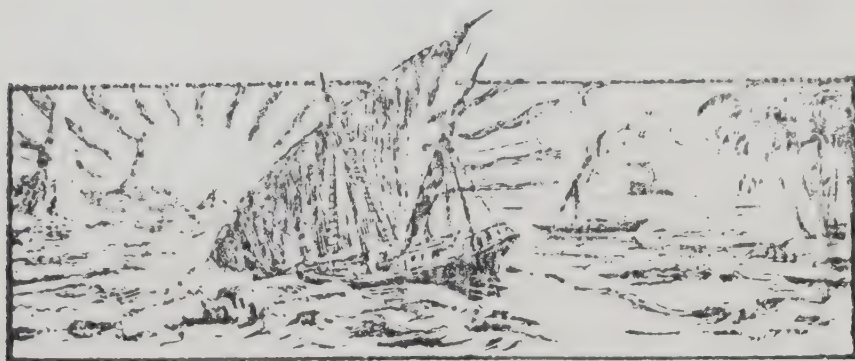
When the survey and classification are complete, the Governor-General will by decree close the worst districts to rubber collection, so as to give the plants time to recuperate, and a beginning will probably be made in 1908.

As regards plantations, the following general principle has been adopted: Indigenous rubber plants are considered to be the property of the natives, who alone profit by working them. In order, however, to prevent their exhaustion, the Government imposes on the natives who exploit the forests the duty of replanting, and the commandants of districts have to see that it is done. As a result of this policy, 10,000,000 vines had been planted by natives up to the end of 1906. On the other hand, plantations of foreign rubber trees are made entirely by the State, and when ready for production, will be exploited either directly by the Government, or by private individuals under concession.

Up to the end of 1906 the Government had planted 100,000 trees, consisting of heveas, castilloas, funtumia, and ceara. The plantations are made exclusively in Lower Guinea and Lower Dahomey. For 1907 a credit of £3,200 has been provided, with which it is expected that from 300,000 to 400,000 trees will be planted, besides nursery plantations for succeeding years.

The intention is to set apart every year a credit of from £4,800 to £6,000 for this purpose, and to plant an average of 500,000 trees every year.





## GLEANINGS.

Mr. A. W. Hill, Fellow and Dean of King's College Cambridge, and University Lecturer in Botany, has been appointed Assistant Director of the Royal Gardens, Kew.

Mr. Henry Powell, formerly Agricultural Superintendent of St. Vincent, has been appointed Chief of the Economic Division in the re-organized Agricultural Department of British East Africa.

It is stated from Berlin that the banana trade is extremely active. An English firm there is arranging direct importations from Honduras, and a regular direct steamship service from the West Indies is to be started next season.

The *St. Thomas Mail Notes* states that the last transshipment of cotton from Tortola has brought the output for the present year up to 10,000 lb. of cotton and 12 tons of cotton seed.

Messrs. L. Rose & Co., Ltd., advertise in the *Dominica Guardian* that they are willing to pay 4s. per barrel for ripe limes. This increased price should greatly benefit the peasant cultivator of limes.

Mr. William Leslie, senior agricultural instructor attached to the Botanic Gardens, Trinidad, has obtained an appointment at Lagos, in the employ of Messrs. Cadbury Bros., the well-known cocoa merchants, at a salary of £500 per annum.

There are a few vacant scholarships at the St. Lucia Agricultural School for respectable, healthy, intelligent boys about sixteen years of age. Further particulars may be obtained on application to Mr. J. Chisnall Moore, Agricultural Superintendent, St. Lucia.

Over 700 bales of Sea Island cotton, of an estimated value of £28,000, are reported to have been ginned at the central cotton factory, St. Vincent, during the present season, and it is expected that the total crop will amount to 750 bales, or an average of half a bale to the acre cultivated.

Mr. A. W. Cunningham, Curator of the Botanic Station, Nassau, reports that the exports of Sisal hemp from the Bahamas during the first six months of this year totalled 5,584 bales as against 3,954 bales shipped during the corresponding six months of 1906. The value of the hemp is roughly estimated at about £5 per bale.

A fully illustrated article dealing with the banana industry of the West Indies appears in the July number of the *Royal Magazine*. It gives a good deal of information as to the varieties of banana, method of raising, gathering, packing, shipping, etc., and should prove interesting reading to banana consumers in England.

The abundant crop of coffee experienced in Brazil this season will make it necessary to retain the stock in hand for a long time, as if the whole was put on the market, ruin would result to many producers. The State of Sao Paulo retains now 7,000,000 bags, and there are 900,000 bags at Rio Janeiro and Santos, apart from 7,000,000 bags at various centres in Europe and America.

During the first six months of the year, the shipments of sugar from Trinidad amounted to 377,952 bags and barrels as against 455,856 bags and barrels in the corresponding period of 1906. The exports of cacao during the past six months were 16,508,870 lb., as compared with 15,924,240 lb. in the first half of last year, 20,733,115 lb. in the corresponding period of 1905, and 27,470,530 lb. in the first six months of 1904.

Dr. J. E. Duerden, M.Sc., Ph.D., formerly Curator of the Museum in Jamaica, and now Professor of Zoology at the Rhodes University College, Grahamstown, South Africa, writes that the Rhodes College is at present evolving schemes for the introduction of Nature Study and Agricultural Education into the curriculum, and that help has been derived from a study of publications giving the experiences of the Imperial Department of Agriculture for the West Indies in this connexion.

From a note in the *Dominica Guardian* of July 12 last, it appears that a good deal of milk adulteration goes on in Roseau, this watered milk being afterwards hawked round the town by small girls. The *Guardian* urges, in the interests of the public, that milk vendors should be licensed, that children should be forbidden to retail milk, and that an officer should be appointed by the Roseau Town Board, to serve as a milk inspector, his duties being to watch over the milk supply and prevent adulteration.

Mr. W. R. Elliott, formerly of Grenada and Dominica, who holds the appointment of Conservator of Forests in Northern Nigeria, is temporarily attached to one of the departments at the Imperial Institute, South Kensington. Mr. Elliott was invalided home from Nigeria with sleeping sickness, and is probably one of the earliest Europeans to contract that malady. He was for some time at the London School of Tropical Medicine, but is now reported to be in comparatively good health, and likely to recover.

Ostrich farming is an important feature in the agricultural life of South Africa, and the ostrich feathers exported have an annual value of £1,500,000. The occurrence of 'barring,' or faults of colouring in the feathers, which not infrequently happens, reduces their market value, and therefore the introduction (by Dr. J. E. Duerden, Professor of Zoology at the Rhodes University College), of a system of treatment for the elimination of these defects will be welcomed by the farmers, to whom, it is said, it will mean an extra two or three hundred thousand pounds sterling annually.



## AGRICULTURAL SCHOOLS.

### Dominica.

The following is the general report of the examiner (Mr. F. A. Stockdale, B.A.) on the recent half-yearly examination of the pupils at the Dominica Agricultural School:—

Of the sixteen pupils that sat for the examination, two took the senior papers, eight those set for the junior class, and six were new boys. Garraway came out top of the seniors with 76 per cent. of the total marks and Dupigny was top of the juniors with nearly 73 per cent. The average percentage of the senior class was 75.5 and that of the junior was about 59.

The answers sent in by the senior class were of a very uniform character and it was sometimes very difficult to differentiate between their relative merits. Pinard, who came out top in the last examination sent in answers more clearly arranged than did Garraway, but the latter appeared to take more care in answering the questions as fully as possible. Agriculture, which was rather weak in the examination of December last, has not improved much and should receive careful attention. The Chemistry papers were good, but composition, although it has shown some improvement, leaves much to be desired, it being particularly wanting in style and finish.

The work of the junior class was fairly satisfactory, but the answers to the Agricultural questions were rather disappointing. It would appear that the questions were not carefully read, for several careless blunders were made, and often information was given that had not been asked for. The Botany has fallen back somewhat, but Chemistry has improved. Careful attention should be given to Geography, for the answers were not particularly good. Physical geography and the drawing of maps and plans should be improved in order that they may be of the utmost benefit to the pupils. The composition was fair but the grammatical construction was, in some cases, weak.

The new boys took agriculture, arithmetic, geography, composition, and dictation, and some of the answers were fair, showing that the notes given by the masters had received attention.

### RICE GROWING IN BRITISH GUIANA.

The accompanying extract from the *Demerara Argosy* of July 27, bears further evidence to the fact that rice growing is in a very prosperous condition in British Guiana:—

A new rice mill on the most modern lines is to be erected in the vicinity of Hilbernia, Essequibo. Rice cultivation on the West Coast of Demerara is reported to be in a splendid condition, and gives every prospect of a rich harvest. New fields are being continually taken up, and it is expected that within a very short space of time all the available land at Vreed-en-Hoop and Windsor Forest blocks will be taken up by the farmers. The patent rice dryer of Messrs. Crane & Harvey, engineers, is passing through the experimental stage with great success, and is coming up to the most sanguine expectations. It has already been adopted at Danielstown, where 24,000 gallons of rice are turned out per day. The dryer is the means of effecting great saving in the handling, as from the time the paddy is put out of the bags to the time it is put back as clean rice of the very first description, it is not touched by the hands, the whole thing being done by steam machinery.

### PROSPERITY OF SAN DOMINGO.

The trade of San Domingo is in a most prosperous condition, as evidenced by the report of the Customs officials for the year 1906. The value of the foreign trade for the year was \$10,601,815, an increase of approximately \$1,000,000 over that of 1905. The productivity of the republic is indicated by the fact that the exports exceeded the imports by \$2,470,941. The principal products exported were sugar, cacao, tobacco, bananas, and coffee. The amount of sugar shipped was 123,401,271 lb., having a value of \$2,392,406; very nearly the whole of this went to the United States. Cacao beans, having a value of \$2,262,912, representing exports of over 32,000,000 lb., were shipped, of which Germany took rather more than half, and the United States the greater part of the remainder. The yield of cacao for the year 1906 was 3,000,000 lb. over that for 1905, and the price obtained for this product was good, reaching \$11 per cwt. at the close of the year. Germany took rather more than half the tobacco exported, of which the total quantity shipped was 14,965,800 lb., worth \$528,897, the United States taking 3,746,162 lb. The States received practically all the bananas sent abroad, while of the nearly 3,000,000 lb. of coffee shipped, about half went to Germany, and the bulk of the remainder to France and the United States.

Nearly two-thirds of the whole foreign trade was done with the United States, and the greater part of the balance with Germany.

### WOOD OF THE DOWN TREE.

In reply to an inquiry made in the *Agricultural News* (Vol. VI, p. 181) as to districts from which a supply of the timber of the West Indian Down tree (*Ochroma Lagopus*) might be obtained, the following has been received from Mr. Eugene Campbell, Curator of the Botanic Station, British Honduras:—

In this colony the Down tree can be found growing plentifully along the banks of all the principal rivers. It is known here as the 'Bark Log'. The stem is used for making rafts for floating Logwood down the rivers.

Some of the trees here are of large dimensions, being 2 to 3 feet in diameter.

I am told that the Down tree is also plentiful in the neighbouring republics of Guatemala and Spanish Honduras.

### DEPARTMENT NEWS.

Mr. C. Somers Taylor, B.A., who, since November 1905, has filled the post of Assistant Chemist in connexion with Sugar-cane Experiments at the Government Laboratory, Barbados, embarked for Southampton in R.M.S. 'Atrato' on August 1 last, on the termination of his temporary engagement under the Imperial Department of Agriculture.

Mr. R. D. Anstead, B.A., Agricultural Superintendent at Grenada, has been granted an extension of leave on half-pay until September 12 next.



## COCOA-NUT AND FRUIT CULTIVATION IN TRINIDAD.

The *Port-of-Spain Gazette*, for July 18 last, contained the following article dealing with the prospects of cocoa-nut and fruit cultivation in Trinidad:—

Among the minor industries to which attention is paid in this colony are cocoa-nut and fruit cultivations. With regard to the former, it is satisfactory to note from recent returns that there is every likelihood of its becoming prominent in the near future, the annual value for the last two or three years having increased in a marked manner. The figures showing the quantity and value are thus given in the Hon. R. H. McCarthy's recent and able report on the Trade of the Colony for 1906-7: 13,131,296 cocoa-nuts, value £40,639; copra, 3,141,057 lb., value £24,928,—a total in value of £65,567.

Cocoa-nut oil, which is only exported to steady the local market, has fallen off in the exports, but, calculating oil and copra at their equivalent in nuts, it is estimated that the exports of cocoa-nuts last year reached twenty-three millions.

It is peculiarly gratifying to observe that planters in Trinidad are not satisfied with limiting their attention to the cultivation of one or two forms of produce only, and that so long as the necessary capital is forthcoming, advantage is taken of every opportunity to widen the variety of their crops, and to make their real estate more productive.

One hopes that the measures for the eradication of bud rot and other diseases, recently suggested by Mr. Stockdale the Mycologist attached to the Imperial Department of Agriculture for the West Indies, will receive due attention, as carelessness and neglect in regard to these important points may result in this growing industry being seriously impeded.

Another young industry meriting attention is fruit. Here, also, efforts are being made to advance cultivation and to reap profits. The total fruit exports in 1906-7 amounted only to £4,682, but it is anticipated that this will be nearly doubled at the expiration of the present financial year. It has been observed with pleasure that experiments with shipments to New York have been successful, and hopes are revived among local fruit growers with regard to the future of this young industry. Once a ready market is found and facilities of sea-carriage are afforded, nothing can stop the progress of fruit growing here, and it seems as if these two desiderata are not so doubtful as they were years ago. The Trinidad Shipping and Trading Company can help very materially in the matter of conveying fruit by sea to New York, and it is generally understood that the company are willing to afford whatever assistance they can in the development of a promising minor industry.

## CACAO EXPERIMENTS AT DOMINICA.

The following account of experiments carried out at Melville Hall estate, Dominica, by Mr. Francis Everington, on the suggestion of Dr. Francis Watts, C.M.G., has been kindly communicated by Mr. Everington. It affords striking instance of the value of scientific advice and assistance in dealing with some of the practical difficulties met with by planters in these Colonies:—

These experiments were undertaken on the recommendation of Dr. Watts after his visit in December 1903. The area under experiment was a field of established cacao in which the trees, instead of being in good bearing, were

gradually dying back. Here and there throughout the field were trees in a first rate condition and bearing well. Taking the latter fact into consideration, Dr. Watts advised that it would be as well to make an attempt to resuscitate the trees instead of, as at first seemed advisable, to abandon them.

A sample of soil from the field in question had, in 1902, been sent to Dr. Watts for analysis. His report on it is briefly summarized as follows:—

PHYSICAL.		CHEMICAL.	
Stones	0·0 per cent.	Potash	Moderate.
Coarse gravel	1·4 „ „	Phosphate	Low.
Gravel	4·9 „ „	Calcium carbonate	Low.
Coarse sand	7·2 „ „	(but reserve of lime occurring as silicate is mentioned as being particularly large).	
Medium „	9·7 „ „	Nitrogen	Moderate.
Fine „	3·8 „ „	Humus	Moderate.
Very fine „	11·8 „ „		
Silt	24·1 „ „		
Fine silt	26·7 „ „		
Clay	1·7 „ „		
Organic matter and combined water	8·7 „ „		
100·0			

It was found, too, as a result of physical analysis, that, after flooding, the moisture retained was equal to 61·8 per cent. of the dry soil.

The first impression was that the soil was lacking in plant food, but from the result of previous experiments in draining, Dr. Watts was of opinion that the land was retaining too much moisture. Finally it was decided to put both theories into practice. Six plots were selected as nearly uniform as possible. These were thoroughly drained by longitudinal drains between each row of trees, with cross drains at every fifth tree. On the first plot no manure was used, and on the remaining five—pen manure, dried blood, sulphate of ammonia, and potash and basic slag were applied.

The improvement in the area treated was immediate, and most striking. The trees at once burst into leaf and flower, and within four months they were quite as good as the few isolated trees mentioned as thriving in the field before drainage. The undrained portions continued to fall off. The manured plots, however, showed no superiority to the control plot.

As soon as possible, the whole field was thoroughly drained in exactly the same way as the experimental plots, except a small area next to the plots.

The field was shortly in excellent condition throughout. The drains are being constantly cleaned out and gradually deepened. The yield from this field is now at least four to five times what it was in 1904, and many other trees are now coming into bearing, which, at the commencement of the work, looked hide-bound and worthless.

The only alteration now being undertaken in this field is the gradual substitution of *Castilloa* rubber for the existing bananas and plantains, it being evident that on the sea-board of this quarter of the island, shade for cacao is essential. At present *Pois dour* (known in some parts of the West Indies as Spanish oak, and in others as Spanish ash), and bread-fruit trees, are the most successful, but it is hoped that a valuable economic tree may gradually be substituted for these.



## CACAO CULTIVATION IN WEST AFRICA.

Mr. Herbert Wright, late Controller of the Government Experiment Station, Peradeniya, Ceylon, delivered an address dealing with the above subject, before the Liverpool Chamber of Commerce, on June 3 last.

In the course of his address Mr. Wright pointed out that cacao was a product which lends itself to improvement much more than many others largely cultivated in the tropics, and it is important that growers should thoroughly study the principles of manuring, budding, seed selection, grafting, etc., as it is by these means that improvement can be brought about. The fact that cacao can be grown with success in association with rubber trees, is a point well worth remembering.

Speaking of the cacao industry in the Gold Coast Colony, Mr. Wright said that the success which it has recently achieved is nothing less than remarkable.

In 1891, the colony exported no more than 80 lb. of cacao; in 1897, the exports had reached 150,000 lb., and in 1900 had advanced to 1,200,000 lb. When the trees are grown under favourable conditions, crops are yielded from the third year onwards. The greater part of the cacao of the world is yielded by the species *Theobroma cacao*, of which there are many varieties, the chief differences among them being in the size, colour, and flavour of the seeds. Those which yield fine, large, cinnamon-coloured beans are the varieties to be encouraged, as the produce commands a high price. The importance of planting the best varieties will be realized when it is understood that the price obtained for the produce may vary from below 40s. to over 90s. per cwt. But climate and soils naturally have a large share in determining which variety is the most suitable to grow in any given district. To produce the most satisfactory results too, careful attention must be given to pruning, as this is a great means of helping the tree to yield its best.

Speaking of the diseases to which the cacao plant is subject, Mr. Wright said that there were over fifty insect and fungoid pests known which attack various parts of the plant, but not one had been met with which could not be successfully fought. He then gave from his own experience, as a typical example, details of a severe attack of fungoid disease which occurred in a cacao plantation, and which was successfully treated.

In speaking of fermentation, the lecturer described the methods followed by the planters of Ceylon, who for this purpose do not separate the seeds of different varieties, but allow them to ferment together in one heap. Owing to the fact, however, that the rapidity of fermentation depends, to some extent, on the thickness of the seed integument, the process is complete in the thin-skinned varieties, such as the Caracas and the Nicaraguan, long before this has come about in the thicker-skinned seeds of the Amelonado or Forastera varieties. If all the varieties are fermented in one heap, the fermentation is uneven, and the final product is not uniform in quality.

Although the fermentation process is a very important factor in deciding the quality of the resulting cacao, great differences exist in the amount of time allowed for it, and most people judge when it is complete by the appearance and smell of the mass of seeds.

Cacao seeds are sometimes fermented for two days only: in the case of other varieties the process is allowed to continue for as long as twelve days, in order to produce the best results. The exact length of time required can only be determined by practice, as the chemical and physical characteristics of the same variety vary according to the

plant, its diseases, and, to some extent, climatic conditions.

Fermented cacao seeds are generally washed, although this practice is not always followed. Unwashed cacao, however, is less clean, and heavier than the washed product, and weight for weight contains a less proportion of essential substances; it does not therefore command the same price when sold by weight. The dried pulp on the outside of the seeds is removed by washing, and the drying and curing of the cacao is thereby more easily effected.

The greater part of the cacao produced in Ceylon is ready for shipment when it has been dried and cured, but Mr. Wright mentioned that in the West Indies it is customary to colour the seeds by the use of brick dust, red earth or red ochre, to improve the appearance of the integument. This treatment is, of course, accompanied by a variable increase in weight. This colouring and polishing matter, if applied, should be well-dried, and mixed with the cacao seeds the day after drying. The unwashed cacao is said to keep better after being subjected to this treatment.

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## COFFEE AND CACAO IN HAYTI.

The particulars given below, relating to the production and export of coffee and cacao in Hayti, are taken from the last *Report* of the British Consul stationed in the republic:—

The coffee crop, although below the average, was 12,000,000 lb. in excess of the crop of 1905. Nearly the whole of the coffee produced is exported to France. The low prices of coffee in Europe render the exportation of that article from this republic difficult under existing circumstances; and as coffee is the staple product of the country, the commercial prosperity of the republic suffers accordingly. In former times Haytian coffee fetched as much as 80 francs (£3 4s.) and over, per 100 lb. in France, but at present barely half that amount can be obtained. There has however, been no really abundant crop since the year 1903-4. There would appear to be no signs of the only remedy applicable to the situation, viz., an increase of production, but rather, indications that the production of coffee is on the down grade, as it is feared that many small planters (owners of coffee trees) will now dig up the coffee plants, and grow plantains, bananas, and yams.

As the result of a law passed at the end of 1906, the export duties on coffee pickings were raised from \$2 to \$2.75 on every 100 lb. exported. The better kinds of coffee pay a duty of \$3 on every 100 lb. exported. This law is ostensibly meant to reduce smuggling, and to encourage cultivators to export the higher grades of coffee. Hitherto, inferior qualities have been shipped, by which means exporters saved the duty of \$1 on every 100 lb., whereas, now that they can only save 25c. by shipping inferior qualities, it will pay them better to export the best. It is hoped that a superior grade of coffee will now be cultivated. The average local prices paid for coffee were 25c., Haytian currency, per lb. (2½d.).

The cacao harvest was less than that of the preceding year, and 4,581,403 lb. were shipped, as against 4,924,383 lb. in 1905, and 5,028,615 lb. in 1904. The bulk, as usual, came from Jérémie. Cacao continues to be cultivated in but few districts, and exports remain limited. The local prices paid were 26c. to 30c. per lb., Haytian currency, (3d.). Haytian cacao fetched 50 francs (£2) per 100 lb. in France during 1906, and, at the commencement of this year, it touched as much as 80 francs, (£3 4s.) per 100 lb.



## MARKET REPORTS.

London,—July 23, 1907. 'THE WEST INDIA COMMITTEE CIRCULAR,' Messrs. KEARTON, PIPER & Co.; July 23, Messrs. E. A. DE PASS & Co., July 12, 1907; 'THE LIVERPOOL COTTON ASSOCIATION WEEKLY CIRCULAR,' July 19, 1907.

ARROWROOT—St. Vincent,  $2\frac{1}{4}d.$  to  $3\frac{1}{2}d.$  per lb.  
BALATA—Sheet,  $\frac{2}{3}$  to  $\frac{2}{4}$ ; block,  $\frac{1}{10}$  to  $\frac{1}{10}\frac{1}{2}$  per lb.  
BEES'-WAX—£8 to £8 7s. 6d. per cwt.  
CACAO—Trinidad, 88/- to 94/- per cwt.; Grenada, 82/- to 86/- per cwt.  
CHILLIES—Japanese, fair large red and yellowish, 19/- to 20/-; Zanzibar and Mombasa mixed, 17 6 to 20/-; Sierra Leone, 28/6 per cwt.  
COFFEE—Jamaica, 42/- to 56/-; Santos, 28/6 per cwt.  
COPRA—West Indian, £23 10s. to £23 15s., c.i.f. per ton.  
COTTON—West Indian, good medium, 7 75d.; West Indian Sea Island, good medium, 19d.; medium fine, 20d.; fine, 21d. per lb.  
FRUIT—  
BANANAS—Jamaica, 5/6 to 7/6 per bunch.  
PINE-APPLES—Antigua, 1<sup>u</sup>s. to 13s. per barrel. St. Michael, 1/- to 3/- each.  
GRAPE FRUIT, 11/- to 14/- per box.  
ORANGES—Jamaica, 10/- to 12/- per box.  
FUSTIC—£4 5s. to £4 15s. per ton.  
GINGER—no quotations.  
HONEY—Dark to good pale and fair white, 17/- to 25/-; fine white set, 27/6 to 28/- per cwt.  
ISINGLASS—West Indian lump,  $\frac{1}{6}$  to  $\frac{1}{10}$ ; cake,  $10\frac{1}{2}d.$  per lb.  
LIME JUICE—Raw,  $\frac{1}{2}$  to  $\frac{1}{5}$  per gallon; concentrated, £24 10s. per cask of 108 gallons; Distilled Oil,  $\frac{3}{2}$  to  $\frac{3}{3}$  per lb.; hand pressed,  $\frac{4}{3}$  to  $\frac{4}{6}$  per lb.  
LOGWOOD—£4 5s. to £4 15s.; Roots, £3 5s. to £4 5s. 6d. per ton.  
MACE—West Indian good,  $\frac{1}{5}$  to  $\frac{1}{6}$ ; fair,  $\frac{1}{3}$  to  $\frac{1}{4}$ ; ordinary,  $\frac{1}{1}$  to  $\frac{1}{2}$ ; pickings 1/- to  $\frac{1}{1}$  per lb.  
NUTMEGS—Small, 138's to 120's,  $4\frac{3}{4}d.$  to  $5\frac{1}{4}d.$ ; 120's to 112's,  $5\frac{1}{2}d.$  to  $5\frac{3}{4}d.$ ; 102's to 106's,  $5\frac{3}{4}d.$  to 6d.; 90's to 94's,  $6\frac{1}{2}d.$  to 7d.; 88's to 78's, 7d. to  $8\frac{1}{2}d.$ ; 74's to 70's, 9d. to  $9\frac{1}{2}d.$ ; 68's, 10d.; 66's,  $\frac{1}{1}$  to  $\frac{1}{2}$ ; 64's,  $\frac{1}{4}$ ; fine 110's, 6d.; long 110's to 106's,  $5\frac{1}{4}d.$  to  $5\frac{1}{2}d.$ ; dark 117's,  $5\frac{1}{4}d.$ ; defective,  $4\frac{1}{4}d.$  to  $4\frac{3}{4}d.$  per lb.  
PIMENTO—Fair,  $2\frac{3}{4}d.$  to  $2\frac{7}{8}d.$  per lb.  
RUBBER—Hard cure fine spot,  $\frac{4}{10}\frac{1}{2}$ ; soft<sup>1</sup> cure fine,  $\frac{4}{8}\frac{3}{4}$  per lb.  
RUM—Jamaica, common  $\frac{2}{7}$  to  $\frac{2}{10}$ ; good to fine, 3/- to 8/-; Demerara,  $\frac{1}{0}\frac{1}{2}$  to  $\frac{1}{2}\frac{1}{2}$  per proof gallon.  
SUGAR—Crystals, 16/6 to 17/-; Muscovado, Barbados, 9/6 to 10/6; grocery, 15/- to 16/-; Molasses, 15/- to 16/- per cwt.

New York,—July 12, 1907.—Messrs. GILLESPIE BROS. & Co.

CACAO—Caracas, 18 $\frac{3}{4}$ c. to 20c.; Grenada, 18 $\frac{3}{4}$ c. to 19 $\frac{1}{2}$ c.; Trinidad, 19 $\frac{1}{2}$ c. to 20c.; Jamaica, 16 $\frac{1}{2}$ c. to 18 $\frac{3}{4}$ c.; Dominica, 21c. to 22 $\frac{1}{2}$ c. per lb.  
COCOA-NUTS—Jamaica, \$23.00 to \$35.00; Trinidad, \$20.00 to \$34.00 per M.  
COFFEE—Jamaica ordinary, 7 $\frac{3}{4}$ c. to 7 $\frac{7}{8}$ c.; good ordinary, 8c. to 8 $\frac{1}{2}$ c.; good washed, 10c. to 11c.; Rio No. 7, 6 $\frac{3}{8}$ c. to 6 $\frac{1}{2}$ c. per lb.  
GINGER—Small to bold dark root, 15 $\frac{1}{2}$ c.; small to bold bright, 16c. to 16 $\frac{1}{4}$ c. per lb.  
GOAT SKINS—Jamaica, Antigua, and Barbados, 55c.; St. Kitt's, St. Thomas, and St. Croix, dry flint, 53c. to 55c.; heavy dry salted, 41c. to 43c. per lb.  
GRAPE FRUIT—Jamaicas, \$5.00 per barrel.  
LIMES—\$5.00 to \$6.00 per barrel.  
MACE—35c. to 49c. per lb.  
NUTMEGS—75's to 80's, 15c.; 80's to 85's, 13c.; 90's to 100's, 12 $\frac{1}{2}$ c.; 100's to 110's, 12c.; broken and shrivelled, 7 $\frac{1}{2}$ c. per lb.

ORANGES—Jamaica, \$4.50 to \$5.00 per barrel.

PIMENTO—5 $\frac{1}{2}$ c. per lb.

SUGAR—Centrifugals, 96°, 3.83 $\frac{1}{2}$ c. to 3.87 $\frac{1}{2}$ c.; Muscovados, 89°, 3.37c. to 3.37 $\frac{1}{2}$ c.; Molasses, 89°, 3.08 $\frac{1}{2}$ c. to 3.12 $\frac{1}{2}$ c. per lb., duty paid.

## INTER-COLONIAL MARKETS.

Barbados,—August 6, 1907.—Messrs. T. S. GARRAWAY & Co., and Messrs. JAMES A. LYNCH & Co.

ARROWROOT—St. Vincent, \$4.25 to \$4.75 per 100 lb.  
CACAO—Dominica, \$17.00 to \$18.00 per 100 lb.  
COCOA-NUTS—\$14.00 to \$18.00 per M. for husked nuts.  
COFFEE—\$9.50 to \$10.50 per 100 lb.  
HAY—\$1.60 to \$2.10 per 100 lb.  
MANURES—Nitrate of soda, \$62.00 to \$65.00; Ohlendorff's dissolved guano, \$55.00; Cotton manure, \$42.00; Cacao manure, \$42.00 and \$48.00; Sulphate of ammonia, \$72.00 to \$75.00; Sulphate of potash, \$67.00 per ton.  
MOLASSES—no quotations.  
ONIONS—Strings, \$3.50 per 100 lb.  
POTATOS, ENGLISH—\$3.50 to \$4.50 per 160 lb.  
PEAS—Split, \$5.75 to \$5.90; Canada, \$3.05 to \$3.10; Dried \$7.00 per bag.  
RICE—Demerara, \$5.90 to \$6.10 (180 lb.); Ballam, \$6.00 to \$6.60 per bag (190 lb.); Patna, \$3.65 to \$4.00; Rangoon, \$3.00 to \$3.10 per 100 lb.  
SUGAR—Muscovado, \$1.80 per 100 lb.

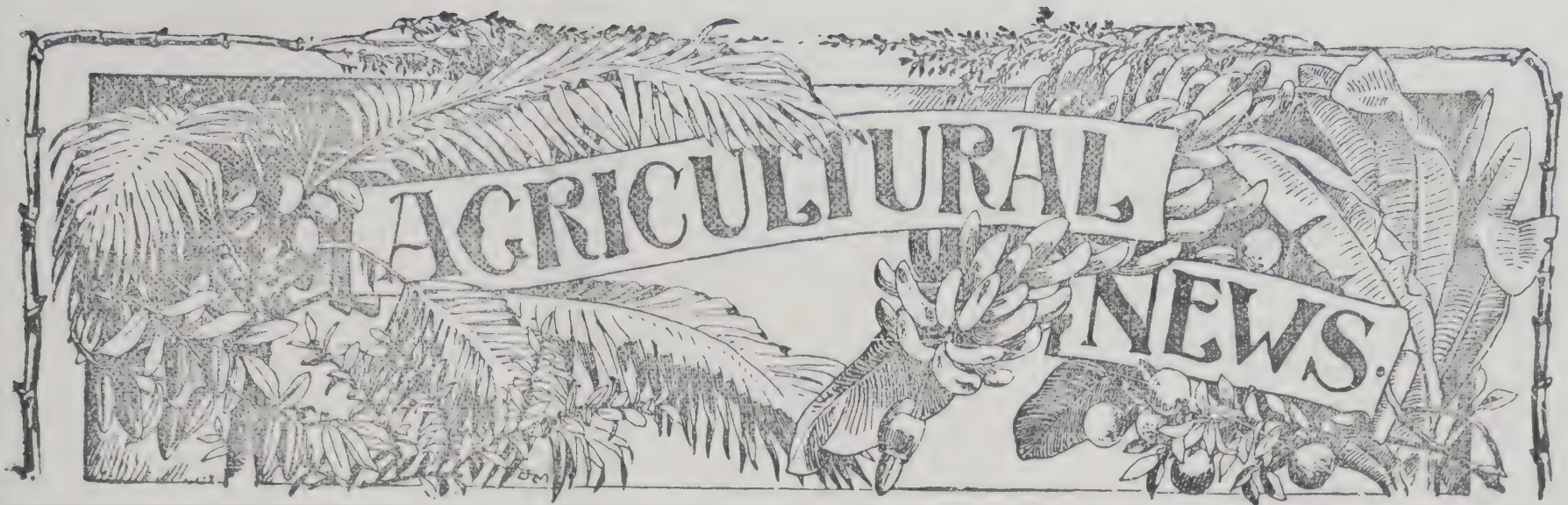
British Guiana,—July 27, 1907.—Messrs. WIETING & RICHTER.

ARROWROOT—St. Vincent, \$10.00 per barrel.  
BALATA—Venezuela block, 32c.; Demerara sheet, 48c. per lb.  
CACAO—Native, 16c. to 17c. per lb.  
CASSAVA—No stock.  
CASSAVA STARCH—\$10.00 per barrel.  
COCOA-NUTS—\$12.00 to \$16.00 per M.  
COFFEE—Creole, 14c. to 15c.; Jamaica, 13c. to 13 $\frac{1}{2}$ c. per lb.  
DHAL—\$5.50 per bag of 168 lb.  
EDDOS—\$1.44 per barrel.  
MOLASSES—16c. per gallon.  
ONIONS—Tenerife, 3c. to 4c. per lb.  
PLANTAINS—28c. to 48c. per bunch.  
POTATOS, ENGLISH—Nova Scotia, \$6.00 to \$7.00 per barrel.  
POTATOS, SWEET—Barbados, \$2.28 per bag.  
RICE—Ballam, \$6.50 per 177 lb.; Creole, \$5.50 per bag (ex store); Seeta, \$5.50 to \$6.00 per bag.  
SPLIT PEAS—\$5.90 per bag (210 lb.).  
TANNIAS—\$2.16 per bag.  
YAMS—White, no quotations. Buck, \$3.00 per bag.  
SUGAR—Dark crystals, \$2.25 to \$2.55; Yellow, \$2.90 to \$3.10; White, \$3.60 to \$4.00; Molasses, \$2.00 to \$2.20 per 100 lb. (retail).  
TIMBER—Greenheart, 32c. to 55c. per cubic foot.  
WALLABA SHINGLES—\$3.50 to \$5.50 per M.

Trinidad,—July 27, 1907.—Messrs. GORDON, GRANT & Co.

CACAO—\$19.00 to \$19.50 per bag, (110 lb.); Venezuelan, \$18.75 to \$19.25 per fanega.  
COCOA-NUTS—\$21.00 to \$22.00 per M., f.o.b.  
COCOA-NUT OIL—\$1.25 per Imperial gallon (cask included).  
COFFEE—Venezuelan, 8c. to 8 $\frac{1}{2}$ c. per lb.  
COPRA—\$4.00 to \$4.25 per 100 lb.  
DHAL—\$4.45 to \$4.70 per 2-bushel bag.  
ONIONS—\$1.90 to \$2.00 per 100 lb. (retail).  
POTATOS, ENGLISH—\$2.00 to \$2.50 per 100 lb.  
RICE—Yellow, \$5.60 to \$6.00; White, \$5.75 to \$6.00 per bag.  
SPLIT PEAS—\$5.40 to \$5.50 per bag.  
SUGAR—Grocery grades, \$2.00 to \$3.00 per 100 lb.





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## Sugar-cane Experiments in Barbados.

THE sugar-cane experiments in Barbados have now reached a stage in which the seedling canes raised by the Imperial Department of Agriculture are coming into comparison with the standard varieties upon which the great

majority of planters rely for their crops. The time is therefore opportune for a review of the methods pursued during an experimental period of some nine years, in order, if possible, to bring them into touch with the wishes of the practical agriculturists who rely upon the sugar-cane as their staple crop.

One of the great difficulties of the research, the object of which is the improvement of the sugar-cane, is the long period that must necessarily elapse between the time when a cane is raised from seed and the time when it is possible to pass judgment upon its merits. Thus it happens that it is only at the end of nine years' work of a very laborious character, that canes, which, it is believed, will prove important acquisitions to the planter, come forward, as the product of the Imperial Department of Agriculture, for practical trial upon the sugar estates in the West Indies.

It takes nearly a year and a half to raise a stool of canes from seed, and with the employment of irrigation and every other possible means of expedition consistent with thorough and cautious trial, it is some nine years before a new sugar-cane variety can come to a planting test.

It has been the constant and anxious wish of the Department to make these trials and tests as convincing as possible to practical planters, and with that end in view an annual summary of results has been presented to the Barbados Agricultural Society with the invitation to criticise the work done, and to suggest new lines upon which improvement might be inaugurated.

A single stool of cane is the result, after eighteen months of care and waiting, of sowing a cane seed, and



if this proves satisfactory as regards the number and size of the canes, it is cut, weighed and crushed, and the juice analysed. If the analysis is favourable, the stool is irrigated to induce a spring of ratoons, from which a supply of 'plants' is procured with which to propagate the variety. Plots of ten to fifty holes are planted from the stool, and after a few years of trial, the variety, if good enough, is adopted as a 'select variety,' grown in duplicate plots of 100 stools in each of the typical soils of the island. Each year the variety is reaped and weighed and analysed in comparison with the standard variety of the district grown in the same field, and this serves to test the numerous field and factory characteristics of the new seedling. There is first and foremost the tonnage of the cane, and the richness and purity of the juice; then come the germinating power of the plant, and the ratooning power of the stool. The resistance to fungoid and insect attacks, the recumbent or erect habit of the cane, the behaviour in specially wet or dry districts, the behaviour in the crushing mill, and the fuel value of the residue or megass all claim the consideration of the planter.

A careful comparison of the results of the small duplicate plots of one hundred stools, planted in several typical districts, with the results of fairly large estate trials has shown that these small plots give a reliable indication of the potentialities of a new variety, and the results of the small experimental plots may be used as a valuable guide in selecting new varieties for estate trial. Planters have constantly, and for many years, made such use of the results of these plots, and we have the varieties B. 147 and B. 208 as testimony to the practical value of this work.

Amongst the many valuable suggestions that have resulted from the public discussion, at the Agricultural Societies, of the annual results, is the suggestion of plots intermediate between the small experimental plots and the estate fields of canes; and this suggestion has ripened into estate plots of the area of an acre or thereabout. Such a plot permits a number of promising varieties being grown in comparison in the same field without risk of serious loss, and such a plot is large enough to be separately crushed at the estate mill, the juice being measured and analysed. This is very convincing to the practical mind, and as it is the practical man for whom the Imperial Department of Agriculture does its work, any suggestion is gladly welcomed if it helps to bring the work into touch with those for whose benefit the Department was brought into existence.

Acre plots have formed part of the method of the Department for the past three years, and following the

latest suggestions, are now about to receive an important extension. It is proposed to invite a considerable number of estates in each district to plant acre plots of a few of the varieties that, in the same district, have shown exceptional value in one-hundred-hole plots. Each plot will be crushed separately, the juice measured and an average sample sent to the Government Laboratory for analysis. Data will thus be available for ascertaining the sugar yield, and at the same time the other qualities of the variety will come under practical estate observation, on a scale which will appeal more strongly to the practical mind than the smaller plot grown under the same estate conditions.

The soils of Barbados divide themselves into three classes, namely, black soil, red soil, and 'Scotland' soils. Each of these, as well as the question of ratooning, will receive careful attention, and the confidence which the Department has secured is shown by the ready and cordial co-operation which the planter has offered in the prosecution of this work. It is pleasing to be able to record that, of the many offers, some thirty estates will be carefully selected for these acre plots. They represent every locality in the island as regards soils, height above the sea-level, and rainfall, and the plots growing in these different districts will serve not only as an object-lesson of the quality of the best varieties, but also as distributing centres for those that stand the result of planter test and planter scrutiny. This is as it should be. The ultimate judge of the value of a cane variety is the planter, and the wishes of the planters will always receive the careful attention of all the workers in this Department.

## RUBBER IN INDIA.

The recently published Annual Report of the Board of Scientific Advice for India contains the following note with reference to the various rubber-yielding plants of India:—

Much interest has been shown in the valuation of India-rubbers obtained from India. Some of these are of good quality, but the majority of samples came from inferior sources. The chief source of commercial rubber in India is the *Ficus elastica* of Assam, of which there are plantations at Charduar, the output of rubber sometimes amounting to 2,000 lb. per annum. The rubber is not the best in the market, as its yield of pure caoutchouc is but from 80 to 86 per cent., Para rubber affording over 90 per cent. During the year the rubber from trees growing experimentally at Ganjam, Madras, Poona, and Burma were examined. The composition varied within certain limits and on the whole, resembled the Assam product; the Ganjam rubber indicated 88.6 per cent. purity, the Poona sample 82.5 per cent., and that of Burma 82.7. A specimen from Kurseong, Bengal, examined in 1903, afforded 84.3 per cent. of pure caoutchouc.



## SUGAR INDUSTRY.

### Sugar in San Domingo.

Despite the natural advantages of San Domingo as a sugar-producing country, the conditions of the industry do not seem very prosperous there, as will be seen from the following note, extracted from the last *Report* of the British Consul stationed in the republic:—

The cultivation of cane sugar is one of the oldest agricultural industries of the republic, having been in vogue for more than 300 years, with varying profits and occasional losses, according to the world's market price.

The climate and soil being well situated for the production of cane sugar, the average output since 1885 has been from 20,000 to 50,000 tons, the extent of land devoted to the growing of the cane being about 183,754 acres, divided between fourteen estates. Most of the estates are owned by Americans, not one being British. The sugar is shipped in the raw state, there being no refinery in the republic. Eighty per cent. of the production polarizes  $95^{\circ}$  to  $96^{\circ}$ ; 12 per cent.  $81^{\circ}$  to  $83^{\circ}$ ; and the residue yields molasses of  $42^{\circ}$ , which is used in the country for making rum. Owing to the low market price of raw sugar, the industry here is in great danger of becoming a thing of the past, unless a radical change takes place. At the present price many of the planters are barely able to pay the interest on the large loans they have had to contract in order to keep up their plantations, and meet other sundry heavy expenses, which a sugar plantation is bound to have during a sequence of bad years. There seems less and less foundation for the hope that better times will come and that prices must improve, and the planters are becoming tired of borrowing money with so little chance of matters improving; hence if some advantage is not given to San Domingo sugar imported into the United States, the outlook of this industry is anything but bright.

### Java's Sugar Industry.

A lengthy review of the conditions of sugar-cane culture in Java, the factory system and methods of working up the sugar, the returns obtained, and the sugar exports, was contained in a recent number of the *Journal des Fabricants de Sucre*, from which it appears that the sugar industry of the island is in a well-managed and flourishing condition. The chief particulars are given below.

Java's sugar industry is of interest not only on account of its rapid growth within the last dozen years, but also because of the remarkable extent to which it has been aided by technical knowledge and skill, and the extremely low net cost of production which is the rule. The production of sugar has increased from 534,390 tons, which was the crop in 1896, through 725,030 tons in 1898, 803,735 tons in 1901, to 1,055,043 tons in 1904, since when the annual yield has been practically stationary.

Having regard to the number of factories at work, the extent of Java's sugar production is an ample testimony to the highly concentrated system in vogue, a system which contributes largely to the reduction in general expenses and in the net price of the finished product. In 1906, 175 factories produced 1,048,275 tons of sugar, or an average of 59,900 sacks (of 220 lb.) of raw sugar per factory. In 1905 the average for 172 factories was 60,000 sacks, and in 1904, for 176 factories, 59,950 sacks.

As to the area under cultivation in Java, it was estimated in December last as very nearly 280,000 acres, as against 273,000 acres in 1906, and 260,300 acres in 1905. The sugar-cane area is therefore increasing from year to year.

Judging by the results, the methods of cultivation adopted must be of the most perfect kind. In 1905 the average yield of cane per acre, obtained over the whole island, was 87,118 lb. or nearly 39 tons. This is the result of intensive culture, and the high yields obtained have a great deal to do with the exceedingly low net cost of production.

The quality of the sugar turned out by the factories has also greatly improved during the last ten years. While in 1896 the amount of first-grade sugar produced was 503,448 tons and that of low-grade just over 45,000 tons, by 1905 the output of first-grade sugar had just doubled, but that of low-grade sugar was still about the same figure.

The yield of raw sugar per cent. of cane in Java is 10.5. This is ahead of Cuba, where the cane has yielded no more than 9.86 per cent. of raw sugar.

In 1905, the average extraction of sugar per acre was 9,238 lb., and the returns of 46 per cent. of the factories show an extraction of over 9,170 lb. per acre, the highest individual production being 12,441 lb.

As showing the economical method of working at the factories, it is stated that the cost per cwt. of sugar turned out varies from about 5s. 10d. to 7s., leaving a profit of from 2s. to 3s. 9d. per cwt. of sugar produced.

The exports of sugar from the island have increased from 870,703 tons in 1903, to 1,050,395 tons in 1905. This is chiefly sent to British India, Hong Kong, and Japan. The exports to Europe have been of comparatively small importance.

### Sugar in Mexico.

An interesting article appears in the August number of the *Mexican Investor*, in which the suitability of the republic as a sugar-producing country is discussed, and particulars are given of the present state of the industry:—

The cultivation of sugar appears to be a very ancient industry in Mexico, having been introduced soon after the conquest by the Spaniards, and sugar was exported from thence to Europe so long ago as 1553.

The climate and soil of many of the States of Mexico appear to be very favourable for sugar production, in some especially so, and it is stated that instead of merely supplying her own markets, there is no reason why Mexico should not rival Cuba as a sugar-producing country, instead of merely making one-tenth the quantity turned out by the latter. The reason why the industry is at present so limited is that, owing to the primitive methods of manufacture which have been in vogue to within only very recent years, the difficulty of obtaining labour, and the high cost of transportation, it has been impossible to produce sugar to sell at a profit outside of the immediate local market of each plantation. The crop return in 1900 was only 75,000 tons; this had increased to 107,500 tons in 1905-6, and the crop for 1906-7 is estimated at 115,000 tons. The average crop per acre all over the country is from 40 to 50 tons. It is stated that the cane grows to an enormous size, ratoons well, and does not need replanting for eight or ten years.

It is satisfactory to note that signs of development of the Mexican sugar industry are becoming more prominent, new lands are being taken up, up-to-date methods are being adopted, the old plantations are having new machinery installed, and further mills are being built.





## WEST INDIAN FRUIT.

### THE WEST INDIAN LIME.

A good deal of information relating to the West Indian lime (*Citrus Medica*, var. *acida*), its cultivation, yield, manuring, insect and fungoid pests, the various products obtained from the fruit, etc., the progress of the industry in the West Indies, and the improvement of the qualities of the fruit by selection and hybridization, is contained in a paper prepared by Mr. Archibald J. Brooks, F.R.H.S., Resident Master at the Dominica Agricultural School, and published in the June number of the *Journal* of the Society. The accompanying particulars, which have been abstracted from the paper, should prove of interest:—

No less than six valuable articles of export are yielded by the lime: raw juice (which is used in England for the manufacture of the well-known 'Cordial'), concentrated juice (one of the chief sources of citric acid), distilled oil, otto of limes, green limes, and pickled limes. Dominica is now the chief centre of the industry, having far outstripped Montserrat, which originally exported the greatest amount of juice.

The export of lime juice and essential oil from Dominica is of the annual value of £45,370; from Jamaica, £6,000; and from Montserrat, £5,810. In referring to the cultivation of the lime, which is mentioned as being very simple, Mr. Brooks points out that a sandy soil, well drained, and with an elevation of from sea-level up to 500 feet, is most suitable. The young plants, raised from seeds in sheltered nurseries, should be planted, at distances of from 15 to 20 feet both ways, in their permanent places. There is little required in the way of after-cultivation, except weeding from time to time as needed, and the great advantage of mulching the weeds around the roots of the young plants is referred to. By this means not only is plant food supplied, but the surface roots are kept cool and moist during the hot season.

Light crops of fruit may be expected from the young trees in five or six years, the full crop being borne about the eighth or ninth year. The yield per tree, which is naturally somewhat dependent upon local conditions, varies from about three-quarters to one barrel per annum, thus giving an average yield of, roughly, 175 barrels of fruit per acre. A barrel of fresh fruit will yield from 7 to 8 gallons of raw juice, and each gallon of ripe juice contains from 12 to 15 oz. of citric acid.

The methods of manuring with pen manure from cattle that have, to a considerable extent, been fed upon the skins

of the limes from which the juice has been expressed, is described. This method is a very useful and economical one, and the manure is usually applied at the end of the crop time, when the trees most need it.

The various insect and fungoid pests of the lime are touched upon, and mention is made of the attack of Scale Insects which occurred in Dominica in 1902, as a result of which the export of limes and their products showed a fall of £21,900 in the following year. By the vigorous application of the methods recommended by the Imperial Department of Agriculture however, i.e., spraying the affected trees with resin and whale oil soap compound, the attack was got under, and the industry is again in a good state of progress.

The method of collecting the fruit and extracting the essential oil from the rind is next described. It is mentioned that an expert woman can extract from 30 oz. to 36 oz. of oil per day. The yield of essential oil averages about 3 oz. per barrel of fresh limes, and is worth about 4s. per lb. in London, where it is chiefly used for perfumery.

Distilled oil, which is obtained by distilling the raw juice, is worth 1s. 9d. per lb. Particulars are given as to the manner in which the fruit is sorted, the raw juice extracted, strained, and put up for shipment. The method of preparing the concentrated juice, for the manufacture of citric acid, is described, and it is stated that 1 gallon of juice so concentrated should contain about 100 oz. of citric acid.

Mr. Brooks lays stress on the advantages that would accrue to the planter—in the shape of reduced loss of the citric acid during preparation, and less freight charges—if the lime juice were exported in the form of citrate of lime instead of in the liquid condition after concentration, and he describes the method of preparation of the citrate (*Agricultural News*, Vol. VI, p. 213).

As mentioned by Mr. Brooks, 44 tons of citrate of lime were exported from the West Indies during the last few months of 1906, this containing 69 per cent. of pure acid, as against 64 per cent., which is the Sicilian standard. It is expected that in a few years citrate will be the only form in which the concentrated juice will be exported for citric acid purposes.

In the short account given by the writer, of the present condition of the lime industry in the West Indies, it is estimated, roughly, that about 2,500 acres are planted with limes in Dominica, of which only about 1,500 acres are yielding fruit. As far as can be seen, therefore, if present prices of juice remain constant, the value of the lime exports from the island should be practically doubled in the next five or six years.



### BARBADOS GOATS.

In Barbados, goats are mostly kept by the labourers and small peasant proprietors as a means of gaining a few additional shillings. In the principal goat districts a labourer will keep a ram only, while his neighbours keep ewes and raise kids, which are allowed to run loose until they begin to eat the growing crops. They are then tethered and fed up until fit for the butcher, or they are brought to town, and offered for sale in the public market.

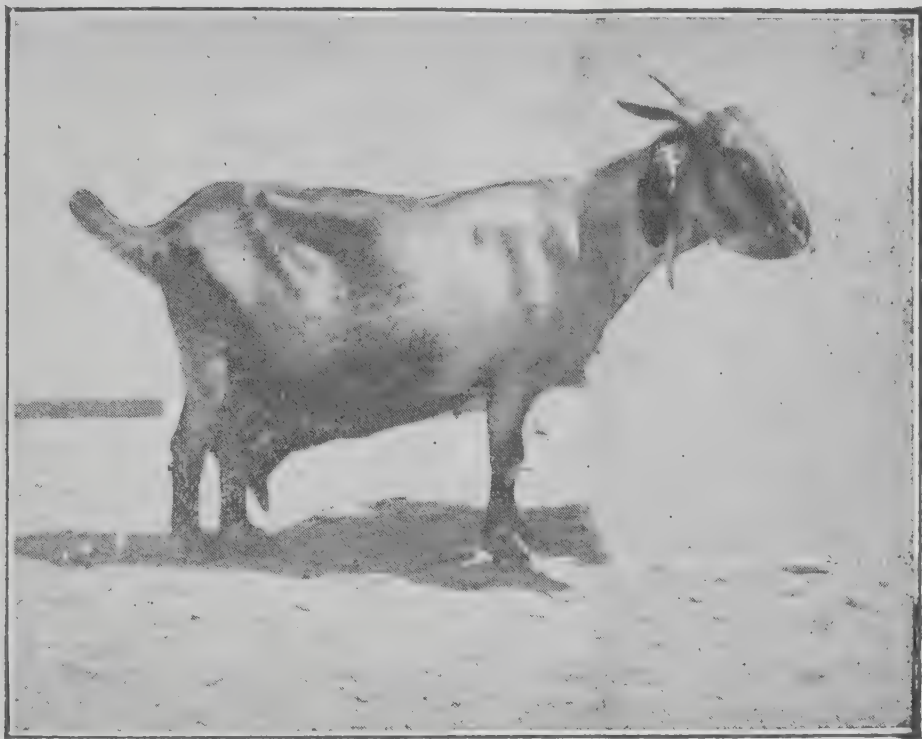


FIG. 18. ORDINARY BARBADOS GOAT.

In Fig. 18, is shown a she-goat of the ordinary Barbados type. Such an animal will give from 3 to 5 pints of milk per day, and her kids will be sold at from 10s. to £1 each.



FIG. 19. BARBADOS GOAT WITH KIDS.

The Imperial Department of Agriculture, besides importing the well-known Anglo-Nubian goat 'Black Rock', and the

pair of pure-bred Toggenburgs, imported, in June 1906, a pair of very fine Punjab he-goats from India.

The two Punjab rams have been greatly appreciated, and members of their progeny can now be frequently seen in Barbados.

In Fig. 19 are shown three kids by 'Rajah,' the larger of the Punjab rams, with their mother, an ordinary Barbados goat. These kids are sold at a very high price when fit to be weaned.

Another pair of kids by 'Rajah' were purchased and shipped to Dominica.

### CASSAVA IN JAMAICA.

In Sir Alexander Swettenham's last *Annual Report* on Jamaica, it is stated that there is a prospect of large areas of land, at present yielding little or nothing, becoming useful for the cultivation of cassava for starch manufacture, and that, in Clarendon, 400 acres are reported under cultivation, while two starch factories have been established.

This should serve to give further interest to the results given below, of experiments with different varieties of cassava, carried out at the Hope Gardens, Jamaica, and fully described in the *Bulletin of the Department of Agriculture* for April 1907. Particulars have been given in past issues of the *Agricultural News* (Vol. IV, pp. 269 and 361, and Vol. V, p. 183) of trials carried out in past years, and those now referred to took place during the past season. In these experiments no less than twenty-six varieties of cassava obtained from Colombia were tested against each other, and against native varieties for yield of starch, dietetic value, and hydrocyanic acid content. Speaking generally, it is stated, the Colombian varieties compared unfavourably with those native to Jamaica, and only six of the introduced varieties gave good results as starch producers at Hope. Some of them might, however, do better in the more hilly parts of the island. Two of the Colombian varieties are worthy of attention on account of their yield of starch, viz., 'Miguela' and 'Negrita 15.' The former gave a return of 13.3 tons of tubers and over 9,000 lb. starch per acre, while the latter yielded 11.4 tons of tubers and 7,863 lb. starch. A native variety of sweet cassava, however, gave a yield of no less than 10,015 lb. of starch per acre, leaving 'Miguela' far behind in this respect, while the return of starch given by the Colombian 'Negrita 15' was exceeded by no less than eight native varieties of cassava.

Experiments with the Colombian varieties have been carried out at Jamaica, as in their own country they were said to be free from hydrocyanic acid, and in this case consumers would be free from risk of poisoning. Tested in the Government laboratory in 1903, after a year's growth in the Liguanea plains of Jamaica, fourteen of the introduced varieties were found to contain .0034 per cent. of hydrocyanic acid in the whole tubers. Now, after a further period of four years' growth in Jamaica, the hydrocyanic acid content has increased to .0124 per cent., or practically fourfold.

It is stated that this development of hydrocyanic acid content is quite in accordance with the general behaviour of cassavas when transferred from higher to lower levels.





### COTTON PROSPECTS IN THE SEA ISLANDS.

Messrs. Henry W. Frost & Co., in their Sea Island Report of July 27 last, have the following note:—

Our crop advices continue favourable, and with the exception of being still backward, the crop is reported as making good progress.

### WEST INDIAN COTTON.

Messrs. Wolstenholme & Holland, of Liverpool, write as follows under date of August 2, with reference to the sales of West Indian Sea Island cotton:—

The market for West Indian Sea Island cotton has become quieter, and prices are now in buyers' favour, as spinners are indifferent about increasing their stocks.

Seeing that the American Sea Island crop prospects are now improving, we are of opinion that we shall experience gradually declining markets from now onwards.

The sales comprise Barbados, 21*d.* to 22½*d.*; Antigua, 20½*d.* to 22½*d.*; St. Kitt's, 18*d.* to 22*d.*; Nevis, 17½*d.* to 20*d.*; Barbuda, 17½*d.*; St. Croix, 21*d.*; Anguilla, 19*d.* to 20½*d.*; St. Vincent, 20*d.* to 22*d.*; St. Martin, 15*d.* to 20*d.*; and a quantity of stains at 8*d.* to 14*d.*, the latter price being for very superior quality.

### SEA ISLAND COTTON IN THE SOCIETY ISLANDS.

The following extract from the last *Annual Report* of the British Consul stationed in the Society Islands, indicates the revival of Sea Island cotton cultivation among the inhabitants of this French colony:—

In response to the high prices now paid in Europe for Sea Island cotton, 52,800 lb. of baled material, valued at £1,052, were shipped from these islands to the United Kingdom during the year 1906. At one time Sea Island cotton was a valuable export from here. Introduced into Tahiti in the late sixties, the annual output of clean, baled material up to the year 1885 averaged 1,070,631 lb. per annum, since when its export has practically ceased. Now, however, in the hope that present prices will be maintained, residents in the Leeward Islands of the Society group are turning their attention to the re-cultivation of this article, and, in the event of their expectations as to price being realized, Sea Island cotton may yet again form a significant item in the export trade of this colony.

### SEASONABLE NOTES.

In the last number of the *Agricultural News* the principles involved, and the benefit gained by moulding up young cotton plants were dealt with, and now it may be pointed out that the cultivation so begun must be carried on so long as the labourers can pass between the rows without damaging the plants.

The destruction of weeds must be very carefully followed up, or they will enter into severe competition with the young cotton, and planters should realize from the very beginning that if success is to be attained, the cotton plant should be given every chance of an unchecked development. Money spent in the provision of labour for keeping down weeds, and for constantly stirring the surface soil, is well laid out, as will be proved by the returns at the end of the picking season.

Constant reference has been made in the *Agricultural News* to the utility of preparing a surface layer of fine loose earth, and this has been repeatedly pointed out as one of the best methods of conserving the moisture in the soil.

No planter can afford to tolerate weeds in his fields; they rob the soil of both plant food and water, and are likely to have a considerable influence on the growth of the plants, and on the yield of cotton obtained. Prior to planting the seed, an excellent preparation may have been given to the soil, but to reap the full benefit of this preparation, the weeds must be kept down and the surface soil constantly stirred.

The depth to which the soil may be cultivated is very important, for great care must be exercised not to damage the lateral roots in any way. It has been found that they are given off from the primary root at an average depth of about 3·4 inches (*Agricultural News*, Vol. IV, p. 229), so that cultivation beyond this depth would destroy many of the roots, and the plant would thus be cut off from much of its normal feeding area. It would be well not to cultivate deeper than 2 inches; if this limit is adhered to there will then be little danger of damaging many of these lateral roots, and the surface mulch resulting from cultivation will be most invaluable to the plants.

In the West Indies cultivation is usually performed with the hoe, principally on account of the abundance of labour, but where labour is scarce, the light American cultivator, drawn by a mule, is being employed, and its use has been attended with success. It is made in such a way that it can pass between the rows of cotton plants, and by its means the soil can be worked to any required depth. It is very adaptable, and can be worked between the rows both when the plants are small, and also at later stages, when, in consequence of the growth of the plant, the distance from row to row has been reduced.



## SEA ISLAND COTTON.

On April 24 last, before a meeting of the National Association of Cotton Manufacturers, at Boston, Mass., Mr. G. A. Gordon, of Savannah, read a lengthy and interesting paper on 'Sea Island Cotton,' which gave a good deal of information relating to the history, the peculiar characteristics, and the uses of this product. The following extracts are taken from the first part of the paper, and it is purposed to reprint further portions in successive issues of the *Agricultural News*:—

Doubtless many of you wonder why Sea Island cotton should be selected as the subject of an article before the National Association of Cotton Manufacturers. The Sea Island crop constitutes only one-half of 1 per cent. of the entire American production. Its value is only about 1 per cent. of that of the total cotton crop of the United States. Its culture is restricted by soil and climate to a narrow strip of the mainland of Georgia and Florida, and to the islands along the coast of South Carolina. Its marketing and consumption engage the attention of a comparatively small number of people. And yet Sea Island cotton is seldom mentioned without attracting immediate attention. It has played a part in the creation, and in the development of the cotton trade which is out of all proportion to its quantity and value, and it has had an influence on the history and economic development, not only of the south-eastern portion of the United States, but also upon that of the British West India Island possessions.

In dealing with the subject, I shall try to avoid, as far as possible, its more technical features, and to touch lightly upon the salient points in its history; upon its present status, and upon its future development.

What, then, is this Sea Island cotton? Whence did it come? How is it produced? Why is it valuable? Where is it spun? Into what products does the yarn go?

The name is a misnomer. Only from 8 per cent. to 12 per cent. of the crop is actually produced on islands, the balance being grown on the mainland from seed originally imported from the islands. The cotton is a black-seeded, long-stapled cotton. It belongs to the group *Gossypium Barbadosense*, Barbados. It is said to have been indigenous to the West India Islands, a perennial plant growing wild there. The first reference to this West India Sea Island cotton is probably found in a pamphlet published in London in 1666, entitled 'A Brief Description of the Province of Carolina, on the Coast of Florida.' This pamphlet contained the following:—

'In the midst of this fertile province, in the latitude of 34° there is a colony of English settled, who landed there on the 29th of May, A. D., 1664. They brought with them most sorts of *seeds* and *roots of the Barbadoes*, which thrive in this most temperate clime. They have Indigo, very good tobacco and *cotton wool*.'

The first authentic record of the introduction of Sea Island cotton (as we now know it) was in 1786, when seed was sent from the Bahama Islands to Governor Tattnall, and William Spaulding, and was by them introduced into Georgia. Referring to this seed, it is stated: 'The cotton adapted itself to the climate, and every successive year from 1787 saw long-stapled cotton extend itself along the shores of Georgia and South Carolina.'

Richard Leake, of Savannah, was probably the first man to plant Sea Island cotton, and in 1788, sent samples to Philadelphia, mentioning in his letter of advice that he

would raise 5,000 lb. of seed-cotton on 8 acres, and also stating that he found great difficulty in cleaning the cotton from the seed.

Nicoll Turnbull was said to be the first planter who cultivated cotton upon a scale sufficiently extensive for exportation. The cotton was raised on Deptford plantation, 3 miles from Savannah.

In South Carolina, the first successful variety of Sea Island cotton was raised by William Elliott, on Hilton Head, near Beauford, in 1790. He records the fact that he bought 5½ bushels of seed in Charleston, paying for them 14s. per bushel, and that he sold his crop for 10½d. per lb.

In 1791, John Scriven, of St. Luke's Parish, planted 30 to 40 acres on St. Mary's River, and sold his cotton at from 1s. 2d. to 1s. 6d. per lb.

In 1805, Sea Island cotton sold at 30c. per lb. while Uplands were selling at 22c. In 1816, it sold at 47c. with Uplands at 27c. In 1825, Mr. Kinsey Burden of South Carolina, sold 60 bales at \$1.10 per lb. and another year sold his crop for \$1.25 per lb. when the average price of Uplands was 9¼c.

Thenceforward, the crop steadily increased, keeping pace with the demand from spinners. The planters grew rich and influential. The effort to raise the cotton was confined to the islands and coasts of South Carolina and Georgia. With the use of slave labour, the planters maintained a high degree of cultivation, and by a judicious system of seed selection, gradually improved the quality of the staple until their crops became famous, and were eagerly sought after by the fine spinners of England and France.

The market for the staple was Charleston, and the entire crop was shipped abroad. The planters believed that slavery was essential to the maintenance of the quality of their product, and they opposed with every means in their power the abolition movement. In 1856, a book was published by David Christy, entitled, 'Cotton is King,' which dealt exhaustively with the relation between slavery and cotton, and concluded that the 'United States' monopoly of the cotton markets renders slavery impregnable.'

In the year 1850, emigrants from Carolina commenced to move into Florida, where the settlers soon discovered that the region known as East Florida was capable of producing a quality of Sea Island cotton similar to the genuine island cotton, though not quite so excellent in staple. They imported seed, and shipped their lint-cotton to Charleston. Several years later, Savannah, the original Sea Island market, began to make a fight to get the business of these Florida planters away from Charleston. They did not succeed in securing the product of the Carolina Islands, but being nearer to the Florida plantations, and taking advantage of the extension of railroads into that section, the Savannah merchants commenced to build up a market for the mainland Sea Island product, which attracted the notice of export buyers. Their chief difficulty was their inability to compete with the Charleston factors in the prices obtained for the cotton consigned to them.

About this time Georgia growers of Upland cotton who had been in the habit of trading with Savannah began also to emigrate into Florida. By furnishing these planters with money, and also by securing and distributing good island seed, Savannah factors introduced a satisfactory and growing business in Sea Island cotton. Then the civil war came and destroyed the commerce of both Savannah and its competitor, Charleston.



## EDITORIAL NOTICES.

Letters and matter for publication, as well as all specimens for naming, should be addressed to the Commissioner, Imperial Department of Agriculture, Barbados.

All applications for Copies of the 'Agricultural News' should be addressed to the Agents, and not to the Department.

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# Agricultural News

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## NOTES AND COMMENTS.

### Contents of Present Issue.

In the editorial is given a review of the methods pursued in the sugar-cane experiments that have been carried on in Barbados during the last nine years by the Imperial Department of Agriculture.

Under 'Sugar Industry' will be found particulars as to conditions and prospects in San Domingo, Java, and Mexico.

Information with regard to the cultivation of the West Indian lime, and the production of juice, citric acid, etc. will be found on p. 260.

Experiments with varieties of cassava in Jamaica are described on p. 261, and on the same page appears a short illustrated article on Barbados goats.

Cotton Notes, (pp. 262-3), include Seasonable Notes, West Indian Cotton, etc., as well as the first instalment of a paper dealing with the history, characteristics, and uses of Sea Island cotton.

Under 'Insect Notes' appears a brief article on Pond Flies, as well as a note on the progress of the work of the sleeping sickness expedition to Africa.

An article on the Fixation of Nitrogen by Leguminous crops, and the value of these crops for green manuring, appears under Science Notes, on p. 267.

### Cotton Planting.

There is still much cotton to be planted in Barbados, although many fields were sown some weeks ago. The young cotton now coming up is in many instances looking very well; in some parts, however, the crop is showing signs of attack by the aphid. Fortunately nothing has been heard of the cut worm. Much of the cotton land yet unplanted has been already prepared, and is only waiting for the seed until the planter considers the soil has thoroughly settled.

Efforts are being made, as already stated in the *Agricultural News*, to encourage cotton planting in Tobago, and considering the samples which have been produced in that island, with absolutely no preparation or subsequent cultivation, it will be interesting to see what the quality will be like when the land has been well prepared, and the plants carefully tended throughout their growth.

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### Cotton Seed Meal.

The great value of cotton seed meal, both as a fertilizer and as a feeding stuff, is the subject of an article in the *Louisiana Planter* of July 20, and the feeding value of cotton seed oil cake is also referred to. In countries where cotton is largely grown, cotton seed meal is most probably the cheapest form in which nitrogen can be applied to the soil. On account of the large amount of adulteration with ground-up hulls, that took place in America, a law has been passed in the States fixing 8 per cent. as the minimum of ammonia which cotton seed meal shall contain when sold as a fertilizer.

Cotton seed meal frequently forms a very useful constituent of the rations fed to mules in the States, and although at first they generally refuse it, yet when mixed with other foods more to their liking, they may gradually be induced to take it. Experience has shown that good results are obtained by feeding 2 lb. of cotton seed meal per head per day in mule stables, this being given in connexion with molasses feeds.

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### Cuba's Cigar Industry.

The Cuban cigar industry has suffered from several adverse circumstances during the past season. Apart from the strike of one lot of cigar-makers, and the lockout of another, the prolonged drought experienced in the island will undoubtedly be the cause of reducing the quantity of the year's tobacco crop, although it is stated that the quality of the leaf promises to be exceptionally fine.

It is stated in the *Cuba Review* for July that the cigar-making industry of the island is likely to be seriously and permanently affected in another way, inasmuch as more and more leaf tobacco is being sent to Key West and other points in the United States for manufacture there. As in this way the United States' import duty on cigars is evaded, the product can be sold more cheaply than the Havana-made article. The Cuban industry is feeling the effects of this unequal competition, and the Governor is being petitioned to place an export duty on tobacco grown in the island.



### Exports of Fruit from Jamaica.

The increase in the exports of fruit from Jamaica, as shown by the Governor's *Report* for 1905-6, is good evidence of the prosperity of this industry in the island. Bananas naturally took first place, the output for the year being 14,981,145 bunches, of the value of £842,689, this being £328,500 in excess of the value of the bananas exported in the previous year. This is the colony's best record, so far. The United States took by far the greatest number of the bananas shipped, as while 1,217,901 bunches went to the United Kingdom, 13,703,363 bunches were shipped to the United States. Canada also took 57,600 bunches of bananas.

The export of oranges for 1905-6 also shows a very satisfactory advance. The value of the shipments is over £28,000 in excess of the value of those exported during the previous year. The United Kingdom imported 21,640,730 oranges from Jamaica as against 18,683,600 in 1904-5. There was a corresponding decrease in the number shipped to the United States, where imported oranges have to face a high duty, as well as competition with home-grown products. The shipments of oranges to Canada were about 7,479,875, and shows steady increase during the last three years. Exportation of grape fruit also materially increased, but mangos and pine-apples show a decrease.

### Shipments of Live Fish.

It has long been known that many kinds of fish can live for some time out of water, provided their gills remain wet, and bearing this fact in mind, experiments have recently been carried out in Germany with a view to devising a cheap method of transportation for live fish. The results are stated by the American Consul at Frankfort to have been very satisfactory.

The gills in the fish have the same function as the lungs in the human being, and are the organs by means of which aeration of the blood is brought about, the difference being of course that the fish can only obtain the necessary oxygen when the latter is dissolved in water, and cannot take it direct from the air.

The aim of the experiments referred to was to keep the gills wet, and to see that the moisture was well charged with oxygen. The fish were accordingly placed in a wooden box, capable of being hermetically closed, and containing water to the depth of about  $\frac{2}{3}$  inch, or having a supply of wet rags at the bottom. The box was closed, and the evaporation which took place kept the air saturated with moisture, and so the gills of the fish were kept from drying up. A current of oxygen, which had previously been passed through several water bottles in order to become saturated with moisture, was led through the box by a tube. By these means the fish were provided with their supply of oxygen through the necessary medium of water, the latter being in the form of vapour.

Carp, tench, and other fish remained in the box for from three to four days perfectly well, and when placed in water to be fed, they swam about in a lively manner, and appeared perfectly fresh.

### Camphor Production in the United States.

The experimental work towards the production of camphor that is being carried out in the United States was recently described by Mr. James G. Wilson, of the Department of Agriculture. Through the Department, camphor seeds have been distributed for years past, and trees are growing in large numbers throughout the Southern and Western States. A large manufacturing concern, which uses camphor to the value of \$500,000 every year, is building up a camphor grove of 2,000 acres in Florida, from which it hopes later to derive a good supply. It is stated that satisfactory results have attended the preliminary trials which have already been made in the extraction of the camphor.

### Trinidad Government Stock Farm.

The *Report*, for 1906-7, on the Government Farm, Trinidad, which has just been issued, is very satisfactory, notwithstanding that the Statement of Account shows an expenditure of £1,211 5s. 11d. in excess of the revenue. This, however, as pointed out in the report by Mr. C. W. Meaden, the manager, is explained by the facts that various permanent improvements were carried out during the year, that new land was drained and fenced, and that nearly all the milk produced is sold to public hospitals at half the ordinary price. In view of these facts it is seen that no real loss is incurred in the working.

The general health of all the animals has been good, and no case of infectious disease occurred during the past year.

The stock-breeding returns show that the herd of 166 cows produced 110 calves, these being chiefly the offspring of Zebu bulls. A few of the male calves are kept as bulls; the remainder become working oxen, or are fattened for the butcher. The heifers find a ready market in response to the demand for milking cows.

A new Zebu bull has been imported from East India at a cost of £119. Experience shows that for successful cattle breeding in the tropics, the Zebu is the best breed to use as the foundation of the herd, and by the introduction of a little Shorthorn, Red Poll, and Guernsey blood, it is hoped to establish a blend that will do well, and possess both beef and milking properties.

The Farm piggery contains Berkshires, Tamworths, Poland-Chinas, Large Blacks, and various crosses of the above breeds made for experimental purposes. The Poland-China is mentioned as a breed well suited for the peasant proprietors of Trinidad. The piggery buildings have been enlarged and extended during the past year, and this department of the Farm shows a profit of £59.

Poultry at the Farm suffered much from 'Gapes' and 'Yaws,' and these disorders proved very destructive to young birds during the season. The infectious disease 'Yaws' appears to be the greatest trouble of the poultry keeper in Trinidad, and it is stated that up to the present no means of cure has been discovered. The poultry department showed a small profit of £2 on the year's working.





## INSECT NOTES.

### Pond Flies.

The insects known in the West Indies as Pond flies, belong to the natural order Odonata. They are abundant in most of the West Indian islands, and especially in Barbados, where they may be seen on the wing or at rest on some leaf or branch, in all sorts of localities.

As the life of the immature insect is spent in water, the adults of course occur in great numbers in the neighbourhood of swamps and stagnant water, but they are found in pastures and cultivated fields as well.

The Odonata have two pairs of membranous wings, which are finely netted with veins, the hind wings being as large as, or larger than, the fore wings. The head and thorax are large, the abdomen long and slender.

The eggs of the pond fly are laid in the water, or on aquatic plants, and the young live in the water, breathing by tracheal gills. Both the adult and immature insects have mouth parts fitted for biting, and are voracious feeders, capturing and devouring other insects and small forms of animal life.

The young pond fly has strong legs and big jaws; the jaws are hidden by the large under lip, which folds up over them like a mask, but which reaches far out when extended, and is armed with powerful hooks with which the insect catches its prey.

When fully grown, the young pond fly crawls up on some plant, where it sheds its skin, and the adult pond fly comes forth. The empty skins may frequently be found attached to the grass and reeds by the water of a pond or swamp.

The winged insect takes but a short time to unfold its wings, and as soon as they are dry, it is able to fly.

The flight of the pond fly is remarkable for its swiftness, and for the complete control which the insect has over it. This is of course necessary in an insect which catches its prey on the wing.

Pond flies are predaceous both as adults and as young, and on this account they are to be classed among the beneficial insects. As they are not discriminating in their captures, but attack many kinds of insects, it will often happen, however, that they catch and eat insects quite as useful as themselves.

Pond flies may be divided into two groups: those that rest with the wings spread out, and those that fold the wings together over the abdomen when at rest. The flies of the former group are the larger and stronger, and are the same as those insects which in other countries are called Dragon flies, Devil's darning-needles, Snake Doctors, etc., which in spite of their names are not only quite harmless, but as already stated, are useful on account of their predaceous habits. The other group includes the smaller and more fragile of the pond flies, which are known as the Damselflies.

Several species of these insects are known in the West Indies. One of the largest (*Anax amazile*) is green, with dark head and abdomen, and has a spread of wings of

about  $4\frac{1}{2}$  inches. This insect occurs in Barbados, and is rather rare.

The most common Barbados species is the medium-sized insect (*Erythrodiplax umbrata*), that has a dark body and lighter wings, crossed by a broad dark band near the middle. More showy than this, and fairly abundant, are the red pond fly (*Tramea abdominalis*) and the green pond fly (*Lepthemis vesiculosus*).

### Sleeping Sickness Expedition.

The London *Times* states that the President of the Liverpool School of Tropical Medicine, Sir Alfred Jones, has received the following telegram from the sleeping sickness expedition of the school, which was sent to Africa early in May last: 'Send quantity atoxyl immediately; cattle experiments indicate success. Montgomery, Trypanosomiasis Expedition, Broken Hill, N.W., Rhodesia.'

Atoxyl is the name of the remedy recommended for therapeutical treatment in cases of sleeping sickness. The sleeping sickness expedition arrived at Kalomo on June 10, where they were the guests of Mr. Codrington, the administrator, who gave every facility for their work. At the end of July, it was intended that Dr. Kinghorn, one of the members of the expedition, should proceed direct to Fort Jameson. Mr. Montgomery, the other member will go west to the River Kafue, and up that river towards the Congo. He will then strike across the country, and meet Dr. Kinghorn on the river Luapala, about November, traversing the whole of the time a territory infested by the tsetse fly. One of the main objects of the expedition, which is financed by the Liverpool School, and supported by the British Protectorates concerned and the British South African Company, is to endeavour to prevent the spread of sleeping sickness into districts hitherto uninfested. The expedition will also study the disease on the spot, and will pay special attention to the disease of animals, and the distribution of biting flies. It is the fourth expedition of the Liverpool School that has been sent to Africa to study trypanosomiasis.

### MANILA BEAN IN JAMAICA.

A few plants of the Manila Bean (*Psophocarpus tetragonolobus*) were raised at Hope Gardens, Jamaica, last year, and the *Bulletin of the Department of Agriculture* states that an experimental plot of the beans will be grown this year. The plant is a native of the Malay Archipelago, and is an annual, producing blue flowers, which are succeeded by pods, square in section when cut across. The root of the plant is long and fleshy. The pods, while green and tender, may be cut into short segments and cooked, being used like French beans, to which they are but slightly inferior in flavour. The ripe beans are not so good as food.

The fleshy root, taken up before the seeds are allowed to ripen, is slightly sweet and is also edible, either cooked or uncooked, and it is stated that in the latter form it is very popular with the Burmese. The plant likes a considerable amount of moisture, is trailing in its habit like the yam, and although it does not itself return a very large profit, yet an excellent yield of sugar is almost always obtained in the year after a crop of manila beans has been raised.



## SCIENCE NOTES.

### Fixation of Nitrogen by Leguminous Crops.

From an article entitled 'Recent Progress in the Practice of Green Manuring,' which appeared in the *Bulletin of the Imperial Institute*, the following particulars, relating to the fixation of nitrogen by leguminous crops, and the advantages of such crops for use in green manuring, have been abstracted:—

Green manuring improves soils on which it is carried out, in several ways. Vegetable organic matter is added, which not only provides plant food, but also improves the mechanical texture of heavy soils, by lightening it, and making it more open. Further, the organic acids produced in the decomposition of this vegetable matter act as solvents upon the soil constituents, and so render more material available for plant nutrition.

Probably, however, the most important advantage consequent upon green manuring is that which follows when a leguminous crop such as peas or beans is the 'green manure,' for by means of such a crop, nitrogen from the air is fixed, or converted into nitrogenous compounds, and stored up in the soil, where it is available for the succeeding crop.

About twenty-five years ago, it was ascertained, as the result of experiment, that leguminous plants were able, under some circumstances, to extract a certain quantity of nitrogen from the air, and to make use of it in their tissue building. The actual method of fixation of the nitrogen by these plants, however, was not understood until 1886, when Hellriegel and Wilfarth furnished an explanation, as the result of experiments and observations made by them. They found that whilst most plants, when raised in sand free from nitrogen, ceased to grow after the reserve nitrogen contained in the seed itself had been absorbed, seedlings of leguminous plants sometimes continued to develop after passing the stage of dependence upon this reserve of food. Obviously, the nitrogen these plants daily added to their tissues was supplied by the air, since it could not be obtained from the soil. Messrs. Hellriegel and Wilfarth noted however—that what had not yet been remarked by other observers—that in all cases where continued growth of the leguminous seedlings did occur, nodules or swellings were to be found on the roots. It was further found that leguminous plants, germinated in sterile sand, soon ceased to grow well, but that if a little water extract of a good, cultivated soil was added, the plants recovered, formed nodules on the roots, and also became capable of absorbing nitrogen. These nodules, upon examination, were found to be full of organisms which, since the sand in which the plants were growing had been sterilized, could only have been derived from the water extract of the cultivated soil that had been added. It was concluded from these observations that the assimilation of free nitrogen by leguminous plants takes place after the formation of root nodules, which are caused by some organism present in cultivated soil.

These organisms have been isolated, and further observation has shown that the different forms associated with different leguminous plants are all modifications of one species, to which the name, *Pseudomonas radicicola*, Beyerinck, has been assigned.

As regards the actual way in which the bacterial organism enables the plant to assimilate nitrogen from the atmosphere, since it has been proved that the organism itself, even when isolated from the plant nodule, can in certain

forms, take up nitrogen, and store it up in itself as nitrogenous matter, there seems little doubt that it also absorbs nitrogen in this way when in the nodule.

The present view of the case, briefly stated, is that, firstly, the bacterium enters the root of the plant, where its originally minute form changes into a rod-like shape, multiplies, assimilates nitrogen, and stores up nitrogenous compounds, and then finally, in the nodule, the rod-like form changes to the branched form, which is ultimately destroyed by an enzyme, or ferment, produced within the plant. The nitrogenous matter is dissolved and absorbed by the plant, and the nodules gradually diminish in size.

In consequence of this power of leguminous plants to obtain supplies of nitrogen from the air, it is obvious that they are of much greater value for green manuring purposes than non-leguminous crops, as apart from adding organic matter to the soil, their growth and subsequent ploughing-in are equivalent to the application of an expensive nitrogenous manure, such as sodium nitrate or sulphate of ammonia.

[Leguminous crops which will give good results in this way in the West Indies, as shown by the results of experiments carried out by the Imperial Department of Agriculture at Barbados, in 1900, are the Bengal bean (*Mucuna pruriens*, var.), Velvet bean of Florida (*Mucuna pruriens*, var. *utilis*), Louisiana cow pea (*Vigna Catjang*, var.), and woolly pyrol (*Phaseolus Mungo*)].

It has been shown that some soils, though capable of growing leguminous crops, are deficient in the specific organisms which enable these crops to assimilate nitrogen. As the result of a complete scientific investigation of the nature and mode of action of the organism, however, the U. S. Department of Agriculture now supply pure cultures of the bacteria in question, by which the soil of any given field, or the seed about to be sown, may be inoculated with the nitrogen-fixing organism. It is stated in the *Bulletin* dealing with the above investigation that the following conclusions have been drawn, as the result of the observations made by the Department: Inoculation is not likely to produce any beneficial effect upon soils which already contain the necessary bacteria, or upon soils rich in nitrogen, or again upon soils which, on account of their acidity, are unsuitable for the growth of leguminous plants. Inoculation is undoubtedly of value where the bacteria do not already exist in the soil, or have lost their activity, as indicated by failure in the growth of leguminous crops and absence of root nodules.

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### THE OUTLOOK FOR CAMPHOR.

The following extract from the *Pharmaceutical Journal* for June 22 last, refers to the possibility of a substitute being found for camphor in the manufacture of celluloid, and to the production of camphor by synthetic processes:—

There have been rumours of a substitute for camphor in the celluloid industry, and although there may be little foundation for such rumours, there is no doubt that research in this direction has been encouraged by high prices. Then there is the problem of synthetic camphor; several processes are being worked in England, in Switzerland, and in the United States, and there is a probability that before long (provided the price of turpentine, on which these processes depend, remains reasonably normal) the synthetic product will be offered at a price lower than the present price of the natural article.





## GLEANINGS.

Sea Island cotton reports from several centres in Georgia state that the young bolls are being shed badly, this being caused by the heavy rainfall lately experienced.

The jack donkey 'Sir Daniel', belonging to the Imperial Department of Agriculture, which was advertised for sale in the *Agricultural News*, has been sold for £60 to a purchaser at Santa Cruz.

Honey, either in the comb, or extracted, can be obtained at the Agricultural School, Dominica, at 6d. per lb. Applications should be sent to Mr. Archibald J. Brooks, at the school.

The British Consul in Hayti states that as much as 87,790,000 lb. of logwood were shipped from Hayti in 1906, as against 78,141,728 lb. in the previous year. The largest quantities went to the United States.

The exports of rice from British Guiana to other parts of the West Indies continue steadily. Recently, the shipments in one week included 340 bags sent to Barbados, and 200 bags to Cayenne.

According to the *Indian Trade Journal* cotton seed crushing will probably be an excellent source of profit in the future, owing to the steadily increasing use of oil cakes both as stock foods and for manure.

It is reported that the cotton fields in St. Vincent appear very flourishing now, and offer every prospect of a good return. The leaf-blister mite has appeared in several places, but serious attack has been averted by prompt action.

The Chilean Minister of Finance states that deposits of nitrate of soda have been discovered at Antofagasta and Tocopilla as rich as the original deposits at Tarapaca. (*Louisiana Planter*, July 27.)

The Report on Immigration into Trinidad for the year 1906-7, which has just been issued, stated that during the past year no fewer than 2,502 persons, of whom 679 were women, came to Trinidad from India. These immigrants are stated to be earning good wages.

Guava trees have been successfully grown in the Audubon Park, New Orleans. These trees have yielded fruit, and efforts are being made to increase the crop, and bring about a home supply of guava jelly, which at present is chiefly imported from Cuba. (*British Consular Report*, 1906.)

Two three-quarter-bred Toggenburg ram goats, five months old, are for sale. Intending purchasers should apply:—Stockmaster, Imperial Department of Agriculture, Barbados.

The *Jamaica Daily Telegraph* of June 25 states that the determined stand made by the Jamaica Pimento Syndicate, in order to obtain a fair price for their produce on the New York market, is meeting with success, notwithstanding the antagonistic efforts of dealers and buyers.

Queensland arrowroot, produced from the root of a plant, *Canna edulis*, (Tous-le-mois), has been placed on the London market, but is not finding a ready sale, and it is stated that there is no likelihood of it displacing St. Vincent arrowroot, to which it is much inferior.

The *Journal d'Agriculture Tropicale*, states that a number of Mexican planters are thinking of substituting cacao or cocoa-nuts for rubber on their estates, on account of the less trouble of cultivation and preparation of the former two articles, and also because their production gives a good and ready profit.

The Official Returns show that the exports of sugar from Barbados, up to July 18 last, were only 25,431 tons as against 42,708 tons in the corresponding period of last year. The shipments of molasses amounted to 56,662 puncheons as compared with 56,993 puncheons for the same period of last year.

There has been a great falling off in the exports of cigars from Havana owing to the strike among the workmen. While no less than 108,111,686 cigars were exported during the first five months of 1906, the number fell to 63,897,190 cigars during the corresponding five months of the present year. The decrease in the value of the exports is \$2,355,035.

A beginning was made in growing Sea Island cotton in Ceylon last season, when 150 acres were planted. Samples of the cotton have been recently received and favourably reported on, and the first consignment of cotton is due to arrive at Liverpool shortly. (*Liverpool Chamber of Commerce Magazine*, July.)

The production of indigo in Java last year showed an enormous decrease as compared with the output for the previous year. While the figures for 1905 were 769,993 lb. those for 1906 were only 409,419 lb. Of twenty-six indigo estates in Mid-Java, thirteen have stopped producing. (*British Consular Report*, 1906.)

The cultivation of the cocoa-nut palm is receiving considerable attention in Java, and several estates have been lately opened up for this purpose. During 1906, however, the production of copra was small, but prices obtainable advanced steadily throughout the year. (*British Consular Report*, 1907.)

The Ottawa correspondent of the *Jamaica Daily Telegraph* states, in the issue for July 29 last, that information has been received to the effect that the Australian Commonwealth is contemplating the sale of its surplus sugar to Canada under preferential arrangements. Last year the surplus of Australian sugar was 14,000 tons, of which South Africa took a small quantity.



## EDUCATIONAL.

### Work of the Agricultural Schools.

In its issue of June 6 last, *Nature* makes the following reference to the work carried on at the Agricultural Schools established by this Department in the islands of St. Vincent, Dominica, and St. Lucia:—

The Imperial Department of Agriculture for the West Indies has established Agricultural Schools at St. Vincent, Dominica, and St. Lucia, and the result has been to provide a good practical training in agricultural science to a selected number of boys. Instruction is given in the theory and practice of agriculture, and in agricultural botany and chemistry, in addition to the subjects of an ordinary education. Each boy receives daily training in raising the crops under cultivation, and in the care of live stock. At each school a portion of the land is divided into experiment plots which are used in testing varieties of different plants, as well as for the introduction of new plants of economic importance, and for demonstrating methods of controlling insect pests and fungoid diseases by insecticides and fungicides. Besides these facilities, the *Agricultural News* of Barbados reports that rabbit breeding is taken up, and pure-bred Belgian hares have been introduced in order to improve the local stock. Poultry raising also receives attention, and now, by the use of incubators, a good supply of well-bred chickens is available for disposal throughout the different islands. The pupils become acquainted with all the details of work in the field before the theoretical knowledge of science necessary for keeping abreast with agricultural progress is learned. It has been found that the blending of practical experience with theoretical knowledge is the most desirable method of turning out young men qualified to take up responsible positions.

### Prizes at the Agricultural Schools.

In the *Agricultural News* (Vol. VI, p. 153), a brief outline was given of a scheme of prizes for the Agricultural Schools at Dominica, St. Lucia, and St. Vincent. The prizes were awarded on the results of the half-yearly examination. There was one prize for competition among all the senior boys of the three schools, and a prize was also offered to each school for its best junior.

For the senior prize there were ten competitors, two from Dominica, four from St. Vincent, and four from St. Lucia. The results were as follows:—

Name.	School.	Percentage of Marks.
1. Mc Connie	St. Vincent	81 (Prize)
2. Garraway	Dominica	76
3. Pinard	Dominica	75
4. Alexander	St. Lucia	73
5. Mc Kenzie	St. Vincent	71
6. Alexander	St. Vincent	71
7. Lawrence	St. Lucia	69
8. Gerard	St. Lucia	69
9. Regis	St. Lucia	67
10. Samuel	St. Vincent	65

The junior prize at St. Vincent was won by Brown, at Dominica by Dupigny, and that at St. Lucia by Gabriel.

## TOBACCO IN PORTO RICO.

Owing to American enterprise it would appear that the tobacco industry of Porto Rico is at present in a very flourishing condition. The following particulars are taken from the last *Annual Report* of the British Consul stationed in the island:—

Tobacco production and manufacture improved greatly during the last year, principally through the enterprise of a large corporation operating under the immediate influence of the United States tobacco trust. The larger operators have been able to adopt the more expensive methods of growing, curing, and general handling, and consequently have increased the production and improved the quality of the leaf. A large portion of the company's crops is grown under cover, the cost of which, although it is said to amount to some £100 per acre, is more than repaid in the enhanced yield and finer quality. These enterprises have had the effect of almost doubling the prices of tobacco lands, and causing hitherto inaccessible places to be taken into cultivation.

The island exported, during the last fiscal year, tobacco, principally manufactured, to the amount of £730,488, an excess of £201,293 over the shipments of the previous year. With the exception of an infinitesimal proportion, all the material, raw or manufactured, was shipped to the United States.

## CULTIVATION OF PIPE CALABASH.

The accompanying note as to the method of culture of the Pipe Calabash in South Africa, was supplied to the U. S. Consul-General at Capetown, by the Agricultural Department of Cape Colony, and is reproduced in the *Agricultural News* in continuation of the information which has already appeared on the subject (Vol. V, p. 399, and Vol. VI, p. 123):—

A medium light loam, or even a sandy soil, is best for the successful growing of the pipe calabash. The growing season will vary with localities from four to five months; the condition under which it grows may be best described as semi-tropical, and it is usually found alongside tobacco, sweet potatoes and the like. It is characteristically a creeper, but occasionally rises into hedges or shrubs, growing as a climber. It requires abundant sunshine, and a warm soil and aspect. It is usually found in vegetable gardens, or on similar fertile, or at least well-manured, spots. Stable manure is commonly used. The stalks of the gourd shrivel when ripening takes place; the gourds are then collected and left on the bare ground in the sun till quite yellow and hard. In polishing and making into pipes, the aim seems to be to avoid breaking through the skin. In some places upright stakes are put round the gourds so as to assist the natural bend of the stem, but elsewhere this is left to nature.

## DEPARTMENT NEWS.

The Imperial Commissioner of Agriculture for the West Indies embarked on the S.S. 'Byron,' on the 14th inst. for New York, in order to attend the Canadian National Exhibition at Toronto, and an International Conference on Plant Hardiness and Acclimatization at New York.

During the absence of Sir Daniel Morris, it has been arranged that Professor J. P. d'Albuquerque, M.A., F.I.C., F.C.S., will sign on behalf of the Commissioner of Agriculture.



## CACAO IN JAMAICA.

The fact that the cultivation of cacao in Jamaica is in a progressive condition is indicated by the following extract from Sir Alexander Swettenham's *Report* on the island for the year 1905-6 :-

The cacao exports show a very satisfactory advance, viz., 31,066 lb., as compared with 23,458 lb. in the previous year, and with 39,953 lb. in 1902, which was our previous best record. As a considerable number of young plantations are coming into bearing, we may look forward to a much more rapid development in this most desirable cultivation. It is to be regretted that more of the banana growers in the island do not adequately realize the profitable opportunity which banana cultivation offers in so many places for establishing cacao, almost free of cost. In the western parts of the island the Criolla variety, distrusted in many places on account of its delicate constitution and poor yield, is reported to thrive well, and its produce is among the best in value. The agricultural instructors and the local branches of the Agricultural Society devote a good deal of attention to much-needed improvement in the curing of the cacao amongst the small settlers.

## INCREASE IN CACAO PRODUCTION.

The *Tropical Agriculturist* for June last contains a short review of the situation of the cacao trade, in which are compared the amounts of cacao produced by the chief countries which cultivate the crop. At present the chief cacao-producing countries of the world are the Portuguese Islands of St. Thomé and Príncipe, which in 1906 exported no less than 53,400,000 lb. of cacao. Many complaints have latterly been made concerning the quality of the cacao from these islands, this being due to the fact that the crops have been stored for some time to increase prices, and the cacao has consequently deteriorated.

The article points out that, according to the latest returns, the two countries which bid fair to provide the greater part of the world's supply of cacao in the future are the Gold Coast Colony and the republic of San Domingo. In both countries the production of cacao is of recent date, but in both the industry is rapidly developing and extending.

Particulars of the continuous increase in the exports from the Gold Coast Colony, referred to in the last issue of the *Agricultural News* (Vol. VI, p. 255), are given, and it is shown that while in 1895 the cacao shipped from the Gold Coast Colony was no more than 28,906 lb., it had advanced to 1,200,749 lb. in 1900, and to 11,407,608 lb. in 1905, while last year the export exceeded 20,000,000 lb. or about 8,600,000 lb. more than that shipped in 1905. It is also reported that more than 6,000,000 lb. of cacao beans were sent out during the first three months of the present year.

Coming to San Domingo, the returns show that the cacao crop has increased from 13,148,415 lb. in 1900, through 17,254,125 lb. in 1903, and 28,190,178 lb. in 1905, to 32,011,460 lb. in 1906, which is really a remarkable development. It is stated that the Government of San Domingo is anxious to encourage and extend the cacao industry by all the means in its power, and with this idea in view, is offering large and uncultivated acreages to intending growers, at moderate prices and on easy conditions.

If the above rate of production continues, there will necessarily soon be experienced a considerable and permanent drop in the price of cacao.

## RUBBER PROGRESS IN THE MALAY STATES.

The *Report*, for the year 1906, of the Director of Agriculture in the Federated Malay States, contains much interesting information as to the progress of the rubber industry in that part of the world. During the past year the area under rubber increased from 50,000 to over 99,000 acres, being practically doubled, while the number of trees, which at the end of 1905 was about 7,000,000, had very nearly reached 13,000,000 at the end of 1906. The output of dry rubber has increased, from about 150 tons in 1905, to 412 tons in 1906.

From the figures given it appears that the average amount of dry rubber extracted per tree was 1 lb. 12 oz. It is stated in the *Report* that many of the trees are over ten years old. Some are mentioned as being over twenty years old, and these give a rubber yield of over 2 lb. per tree per annum; but even taking this into consideration, the average is a very high one, and if it is maintained, means a very large margin of profit over expenses of production.

The enormous area planted with rubber, and the thousands of trees added monthly, naturally very much increase the danger of spreading any disease that may occur, but it is reported that the health of the trees, during 1906, has been generally excellent.

The following extract from the *Report*, relating to distance of trees in planting, is worthy of note:—

Planters have begun to see the value of giving their trees plenty of room, and the argument that to plant more trees than it is intended permanently to keep, has been seen to be both fallacious and dangerous. It is fallacious, because with prices at 5s. and more per lb., and with a very reasonable hope of continuance of such prices, owners will not keep to their intentions of thinning out trees which are giving them a profit of 4s. or 8s. each; and dangerous, because if they did steel their hearts, and cut out their trees, the practice of leaving large numbers of dead rubber roots among healthy trees is a policy which any one acquainted with root diseases, both due to fungi and insects, would condemn, as it brings about serious risks of encouraging troubles of this kind.

The practice, now very general, of planting at unequal distances, i.e., in avenues of trees 24 feet by 30 feet, or 20 feet by 17 feet, has many advantages. It admits direct sunlight all over the ground for a short period every day, and the sun is the cheapest and most effective weapon that the planter possesses against the attacks of fungi and bacteria. When the trees are ten years old or more, the avenue system allows of a quicker and more effective supervision of the plantation, and is a help in enabling the Superintendent easily to locate trees on the estate for disease prevention work or for any other purpose.

As to the exact distance which trees should be planted, situation, soil, rainfall and other factors must be considered, but it is better, having an eye to the future, to err on the side of planting too few rather than too many.

On more than one-third of the total planted acreage in Malaya, there are 200 trees or more per acre, that is, the trees are, if planted at equal distances, 15 feet by 15 feet, or closer. On only one-seventh of the acreage are the trees less than 18 feet by 18 feet. The average number of trees per acre is 168, but as they vary from 50 to 440 per acre, this average figure conveys very little information.



## WEST INDIAN PRODUCTS.

### Drugs and Spices in the London Market.

June is generally looked upon as one of the quietest months of the year in Mincing Lane, and though the prevalence of cold weather and sunless skies has had the effect of keeping people in London this year, there has been no increased activity in trade; the normal dullness has prevailed, and West Indian products generally have been more than usually quiet.

#### GINGER.

At the first spice auction on June 5, there were no offerings of Jamaica, but of Cochin and Calicut 300 bags were put up, of which 50 were disposed of, good plump washed fetching 37s. A week later, Jamaica was represented by 750 packages. The demand, however, was slow, a few only being disposed of at 75s. to 80s. for good ordinary. Sixteen bags of dull washed Cochin were bought in at 36s. per cwt., and 29s. was quoted for fair, slightly mouldy Japan. No Jamaica was offered on the 19th, but Cochin and Calicut were represented by about 400 packages, 90 of which found buyers at the following rates: slightly mouldy washed Cochin, 37s., and lean Calicut, 34s. 6d. to 35s. Bold selected Calicut and good medium were bought in, the former at 100s. and the latter at 72s. 6d. Some 20 packages of washed and scraped African were sold, fetching 64s. to 66s., and rough brown 32s. 6d. At the concluding auction on the 26th, ginger was not represented in any form.

#### NUTMEGS, MACE, AND PIMENTO.

At the auction on the 13th, about 60 packages of Singapore were sold without reserve, at somewhat lower rates than had previously prevailed. In the following week a heavy supply was offered without reserve, and sold at a further reduction, West Indian declining 1d. per lb. for the large sizes, and 1s. 2d. for small. At the concluding sale on the 26th, small sales of West Indian were effected at the following rates: 72s. 9d., and 121s. 5½d. Singapore nutmegs were represented by 50 bags, most of which sold without reserve at 9½d. for 80s., and 5¼d. for defective 79s. Mace was represented at the sale on the 12th by a case of Java, which sold at 1s. 5d. for ordinary curly, and some slightly wormy Penang which was bought in at 1s. 7d. A week later, West Indian fell from 1d. to 1½d. per lb. on previous prices, and on the 26th, Penang was again bought in at 1s. 7d. There was but little doing in Pimento throughout the month. At the last auction on the 26th, 100 bags were offered, and bought in at 2½d. per lb.

#### ARROWROOT.

On the 12th, some 210 packages of St. Vincent were offered, 50 of which were sold at 4d. per lb. for good. On the 26th, 220 packages of good manufacturing St. Vincent were offered, and 100 found buyers at 3½d. per lb. Ninety cases of Natal were also offered, and sold without reserve at 4½d.

#### SARSAPARILLA.

At the first drug auction on the 6th, native Jamaica sold at the following prices: ordinary yellow and mixed pale red to fair red, 1s. 6d.; fair to good bright red, 1s. 6d. to 1s. 8d.; and ordinary lean Lima-Jamaica, 2s. 6d.; genuine grey Jamaica, of which 24 bales were offered, but only 2 sold at 2s. 6d. for fair; 2s. 7d. per lb. was paid for 2 bales of coarse, and 2s. 5d. for 2 bales mouldy and damaged. A fortnight later, namely, on the 20th, much interest was

excited by the offering at auction of about 100 bales, consisting of grey, native, Lima, and Guayaquil, and in consequence of this extraordinary quantity, prices declined.

#### KOLA, LIME JUICE, ANNATTO, ETC.

Of kola, 2 bags of fair split Jamaica halves were offered at the beginning of the month, and were sold for 3d. per lb., and a fortnight later some 4 bags of bold dull Jamaica were disposed of at 2¾d. per lb. Of lime juice, good pale raw Jamaica was quoted at 1s. 6d. per gallon at the beginning of the month, and a week later, 7 casks of fair raw Antigua were disposed of at 1s. 3d. per gallon. At the same sale, good West Indian distilled oil of lime was held at 3s. 2d. per lb., 3s. 1d. being refused. Some 97 packages of annatto seed were offered in the early part of the month, good bright Madras being quoted at 4d. to 4¼d. per lb.; towards the end of the month, this price had advanced ¼d., and dull bricky Ceylon seeds were bought in at 3d. At the beginning of the month, 39 cases of wormy Bombay cashew nuts were disposed of without reserve at 22s. per cwt. On the 20th, 10 bags of good West Indian Cassia Fistula pods fetched from 15s. to 16s. per cwt.

### RUBBER AND CACAO PLANTING.

The *Port-of-Spain Gazette*, of August 8, reprints a lengthy letter received by Sir Alfred Jones from Mr. Herbert Wright, (author of 'Hevea Brasiliensis or Para Rubber,' 'Theobroma Cacao,' etc.), which contains some interesting information relating to rubber planting, and the simultaneous growing of rubber and cacao is also referred to. Although the letter refers primarily to planting on the Ilaro estates in West Africa, the following extracts are of general interest:—

I am, in consequence of the very profitable returns already obtained, strongly in favour of growing rubber and cacao trees on the same ground. Cacao in the wild state grows under the shade of forest trees, and wild rubber trees are always mixed with others, so that the combined cultivation of cacao and rubber is a natural one. The principal rubber trees which can be grown in conjunction with cacao are Para, Castilloa, Manihot, and Funtumia. *Funtumia elastica* trees are indigenous in parts of West Africa, and are being used by the Germans in Africa in conjunction with cacao. Funtumia trees differ from the foregoing in having more erect, cylindrical trunks and short branches, and can therefore be planted closer together than the other rubber trees for the purpose of shading the cacao.

I notice that on the Ilaro Estates the Funtumia saplings are about a year old before being planted out. The transplanting operation, involving the destruction of roots, and often leaves and young shoots, frequently puts the young plants back several months, and may cause their death; the older the saplings the greater the damage done. I would suggest the use of basket or bamboo plants wherever possible, instead of stumps from the nursery. It has paid us in Ceylon, where we have now planted over 100,000 acres.

I am glad to notice that a trial is being made with Para rubber trees as well as the indigenous Funtumia trees. Para and Funtumia belong to entirely different families of plants, and the insect and fungus pests which thrive on one cannot live on the other. This point should be borne in mind in the event of planting being contemplated on a very large scale. Each species can be planted in separate blocks, so that the groups are isolated by being surrounded with unlike species; this serves as a good means of keeping in check the diseases which are sure to rise.



## MARKET REPORTS.

London,—August 6, 1907. 'THE WEST INDIA COMMITTEE CIRCULAR,' Messrs. KEARTON, PIPER & Co.; July 26, Messrs. E. A. DE PASS & Co.; 'THE LIVERPOOL COTTON ASSOCIATION WEEKLY CIRCULAR,' August 1, 1907.

ARROWROOT—St. Vincent, 2½d. to 2¾d. per lb.  
BALATA—Sheet, 2/3 to 2¼; block, 1/8 to 1/8½ per lb.  
BEES'-WAX—£7 15s. to £8 5s. per cwt.  
CACAO—Trinidad, 94/- to 98/- per cwt.; Grenada, 86/- to 92/- per cwt.  
CHILLIES—Japanese, fair large red and yellowish, 19/- to 20/-; Zanzibar and Mombasa mixed, 17/6 to 20/-; Sierra Leone, 28/6 per cwt.  
COFFEE—Jamaica, 37/6 to 52/-; Santos, 28/10½ to 29/- per cwt.  
COPRA—West Indian, £22 10s. to £23, c.i.f. per ton.  
COTTON—West Indian, good medium, 7·85d.; West Indian Sea Island, good medium, 19d.; medium fine, 20d.; fine, 21d. per lb.  
FRUIT—  
BANANAS—Jamaica, 5/6 to 7/6 per bunch.  
PINE-APPLES—St. Michael, 1/- to 3/- each.  
GRAPE FRUIT, 11/- to 14/- per box.  
ORANGES—Jamaica, 10/- to 12/- per box.  
FUSTIC—£4 5s. to £4 15s. per ton.  
GINGER—good, to good common and ratoon, 69/6 to 74/-; low dark and thin, 62/- to 70/- per barrel.  
HONEY—Dark to good pale and fair white, 18/6 to 26/-; fine white set, 27/6 to 29/- per cwt.  
ISINGLASS—West India lump, 1/6 to 1/10 per lb.; cake, no quotations.  
LIME JUICE—Raw, 1/2 to 1¼ per gallon; concentrated, £24 5s. per cask of 108 gallons; Distilled Oil, 3/1 to 3½ per lb.; hand pressed, 4/3 to 4/6 per lb.  
LOGWOOD—£4 5s. to £4 15s.; Roots, £3 5s. to £4 5s. 6d. per ton.  
MACE—Penang, bold red, part wormy, 1/10 per lb.  
NUTMEGS—92's to 86's, 7d. to 7½d.; 115's, 5½d.; 139's to 144's, 4½d. to 4¾d.; 76's to 100's, 2¾d. per lb.  
PIMENTO—Fair, 2¾d. per lb.  
RUBBER—Fine hard, 4s 9½d. to 4s 9¾d.; soft fine, 4s 7¼d. to 4s 7¾d. per lb.  
RUM—Jamaica, common, 2/7 to 2/10; good, 3/- to 8/-; Demerara, 1/0½ to 1/2 per proof gallon.  
SUGAR—Crystals, 16/6 to 18/1½; Muscovado, Barbados, grocery, 15/- to 15/6; Molasses, 11/6 to 12/9 per cwt.

New York,—August 9, 1907.—Messrs. GILLESPIE BROS. & Co.

CACAO—Caracas, 19c. to 22c.; Grenada, 18¾c. to 22c.; Trinidad, 18¾c. to 22c.; Jamaica, 17½c. to 20c.; per lb.  
COCOA-NUTS—Jamaica, select, \$33·00; culls, \$20·00 to \$21·00; Trinidad, \$29·00 to \$31·00; culls, \$18·00 to \$20·00 per M.  
COFFEE—Jamaica ordinary, 7½c. to 7¾c.; good ordinary, 8c. to 8½c.; good washed, 11c. per lb.  
GINGER—Small to bold scraggy root, 15c. to 15½c.; small to bold bright, 15¾c. to 16½c. per lb.  
GOAT SKINS—Jamaica, 52c.; St. Kitt's, St. Thomas, and St. Croix, dry flint, 45c. to 50c.; dry salted, 30c. per lb.  
GRAPE FRUIT—Jamaicas, \$4·50 to \$5·00 per barrel.  
LIMES—\$4·50 to \$5·00 per barrel.  
MACE—34c. to 36c. per lb.  
NUTMEGS—110's, 12c. per lb.  
ORANGES—Jamaica, \$4·50 to \$5·50 per barrel.

PIMENTO—6¼c. to 6½c. per lb.  
SUGAR—Centrifugals, 96°, 3·94c. to 3·98c.; Muscovados, 89°, 3·44c. to 3·48c.; Molasses, 89°, 3·19c. to 3·23c. per lb., duty paid.

## INTER-COLONIAL MARKETS.

Barbados,—August 20, 1907.—Messrs. T. S. GARRAWAY & Co., and Messrs. JAMES A. LYNCH & Co.

ARROWROOT—St. Vincent, \$4·25 to \$4·75 per 100 lb.  
CACAO—Dominica, \$17·00 to \$18·00 per 100 lb.  
COCOA-NUTS—\$18·00 to \$22·40 per M. for husked nuts.  
COFFEE—\$9·50 to \$10·50 per 100 lb.  
HAY—\$1·80 per 100 lb.  
MANURES—Nitrate of soda, \$62·00 to \$65·00; Ohlendorff's dissolved guano, \$55·00; Cotton manure, \$42·00; Cacao manure, \$42·00 to \$48·00; Sulphate of ammonia, \$72·00 to \$75·00; Sulphate of potash, \$67·00 per ton.  
MOLASSES—no quotations.  
ONIONS—\$2·25 to \$3·00 per 100 lb.  
POTATOS, ENGLISH—\$2·80 to \$2·88 per 160 lb.  
PEAS—Split, \$5·90; Canada, \$3·10; Dried, \$7·00 per bag.  
RICE—Demerara, \$5·90 to \$6·10 (177 to 180 lb.); Ballam, \$6·00 to \$6·50 per bag (190 lb.); Patna, \$3·65 to \$4·00; Rangoon, \$3·00 to \$3·10 per 100 lb.  
SUGAR—Yellow crystals, \$3·50 per 100 lb.

British Guiana,—August 10, 1907.—Messrs. WIETING & RICHTER.

ARROWROOT—St. Vincent, \$10·00 per barrel.  
BALATA—Venezuela block, 32c.; Demerara sheet, 48c. per lb.  
CACAO—Native, 16c. to 17c. per lb.  
CASSAVA—No stock.  
CASSAVA STARCH—\$9·50 per barrel.  
COCOA-NUTS—\$12·00 to \$16·00 per M.  
COFFEE—Creole, 14c. to 15c.; Jamaica, 13c. to 13½c. per lb.  
DHAI—\$5·50 per bag of 168 lb.  
EDDOS—\$1·56 per barrel.  
MOLASSES—16c. per gallon.  
ONIONS—Tenerife, 2c. to 2½c. per lb.  
PLANTAINS—24c. to 48c. per bunch.  
POTATOS, ENGLISH—Bermuda, \$5·00 to \$7·00 per barrel.  
POTATOS, SWEET—Barbados, \$2·16 per bag.  
RICE—Ballam, \$6·50 per 177 lb.; Creole, \$5·50 per bag (ex store); Seeta, \$5·50 to \$6·00 per bag.  
SPLIT PEAS—\$5·90 per bag (210 lb.).  
TANNIAS—\$1·50 per bag.  
YAMS—White, no quotations. Buck, \$3·12 per bag.  
SUGAR—Dark crystals, \$2·27½ to \$2·55; Yellow, \$2·90 to \$3·10; White, \$3·60 to \$4·00; Molasses, \$1·80 to \$1·90 per 100 lb. (retail).  
TIMBER—Greenheart, 32c. to 55c. per cubic foot.  
WALLABA SHINGLES—\$3·50 to \$5·50 per M.

Trinidad,—August 10, 1907.—Messrs. GORDON, GRANT & Co.

CACAO—\$23·00 to \$24·00 per bag (110 lb.); Venezuelan, \$42·00 per fanega.  
COCOA-NUTS—\$21·00 to \$22·00 per M., f.o.b.  
COCOA-NUT OIL—\$1·20 per Imperial gallon (cask included).  
COFFEE—Venezuelan, 6½c. to 7c. per lb.  
COPRA—\$4·10 to \$4·25 per 100 lb.  
DHAI—\$4·40 to \$4·60 per 2-bushel bag.  
ONIONS—\$1·90 to \$2·00 per 100 lb. (retail).  
POTATOS, ENGLISH—\$2·00 to \$2·50 per 100 lb.  
RICE—Yellow, \$5·60 to \$6·00; White, \$5·75 to \$6·00 per bag.  
SPLIT PEAS—\$5·40 to \$5·50 per bag.  
SUGAR—Grocery grades, \$2·00 to \$3·00 per 100 lb.





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### Barbados Fancy and Choice Molasses.

**D**URING the latter part of 1903 when the Imperial Commissioner of Agriculture and Mr. J. R. Bovell were leaving Barbados for the United States of America, for the purpose of obtaining information relative to the Sea Island cotton industry of the islands off the coast of South Carolina,

it was suggested by the Barbados Chamber of Commerce that they should, while passing through New York, avail themselves of the opportunity to acquire as much information as was obtainable with regard to the Barbados and Porto Rico molasses industries in New York.

This was done, and the particulars obtained were communicated to the Barbados Government and the West Indian sugar planters in Pamphlet No. 28 of the pamphlet series of the Imperial Department of Agriculture for the West Indies, entitled 'Barbados and Porto Rico Molasses.'

In that pamphlet it was pointed out that although some few people profess to recognize intermediate grades, there were only three grades of molasses usually exported from Barbados and Porto Rico, and these were known as 'Fancy,' 'Choice,' and 'Prime,' respectively. The Fancy molasses was the finest grade, and was obtained at that time almost entirely from Porto Rico. The Barbados molasses was usually of the quality known as Choice, together with a small quantity of the lower grade known as Prime.

In 1903, for the first time, however, a small quantity of the Fancy grade of molasses had been exported from one estate in Barbados. This molasses was reported on as being of good quality, and likely to find a ready market. As there was every probability, at the then relative prices of sugar and Fancy molasses, for the latter to become the more remunerative product, planters were advised to prepare and ship a small quantity in the following year. If the results proved encouraging, they could then increase the quantity year by year, as the demand arose for this superior



quality of molasses, particularly as, owing to the fact that Central Sugar Factories were being erected in Porto Rico, the quantity from that island would rather tend to decrease than increase. This advice has in a great measure been acted upon, and the production of Fancy molasses has been so extended during the past sugar crop season that many estates in Barbados converted the whole of the juice obtained from the sugar-cane into that article.

Unfortunately, up to the present time, no separate account has been kept of the exportation of the Fancy molasses, as distinct from other grades of this product, so that it is impossible to give accurately the quantity manufactured. It may, however, be stated, that for the five years before this grade of molasses was first made, for every hogshead of sugar exported, 82 gallons of Choice and other grades of molasses were shipped. On this basis, it would appear that the Fancy grade of molasses, and the Choice (in which are included the other grades), exported for the past few years have been as follows:—

1905.	4,270 puns.	Fancy,	35,109 puns.	Choice, etc.
1906.	18,264	„	„	43,134 „ „
1907. *	38,400	„	„	* 24,600 „ „

It will be seen therefore, that the production of Fancy molasses in Barbados has within the last three years increased to a very considerable extent. Unfortunately, however, all of this molasses has not been made with the care necessary to produce a first-class article, and no doubt unless an article of high quality and uniform grade is produced, before long the buyers will require that Fancy molasses this article shall conform to some special standard, now that first-grade syrup is being made in the Southern States of America.

In 1903 and 1904, the United States Legislature voted \$15,000 a year exclusively for 'the purpose of investigating, determining, and reporting on the proper treatment and process in order to secure uniform grade and quality of first-class table syrup.'

In accordance with the provisions made for this purpose, experiments in producing sugar-cane syrup—a product similar to the Barbados Fancy molasses—have been carried out by Dr. H. W. Wiley, under the auspices of the United States Department of Agriculture. One of the problems Dr. Wiley set before himself was the possibility of manufacturing a reasonably fair-coloured, bright syrup, without the addition of any chemical substance whatever. As he pointed out, the general value of a table syrup depended upon its

palatability and nutritive properties, and upon its freedom from substances injurious to health; and for this reason, in removing the coagulated matter necessary to secure the proper clarification, he considered it best to rely exclusively upon heat and mechanical methods. This method of clarification has therefore been persistently followed with increased success, until now it can be said from actual experiments that a table syrup can be made from the juice of the sugar-cane, having an attractive light colour, and being practically free from suspended matter.

The next problem attacked by Dr. Wiley, and one which he has practically solved, was the prevention of fermentation in the syrup, and to this end he placed the syrup, while still hot from the evaporator, into barrels which had previously been completely sterilized by live steam, and stoppered with a sterilized cork. Two barrels of syrup prepared, he says, in this way, have now been kept for two summers in the storehouse of the Bureau of Chemistry at Washington, without showing any traces of fermentation. It is therefore evident that the great difficulty hitherto experienced by makers and dealers in consequence of fermentation in the barrels, can be wholly avoided by following the method of preparing and packing outlined above.

In the process of the experiments it was found that the syrup made without the addition of any chemical, depending solely upon heat and mechanical process for the purification of the juice, had a better flavour, and was presumably more wholesome than syrups in which the clarification had been accomplished by lime, sulphur, or any other chemical.

It may be of interest to those planters in the West Indies who are at present manufacturing, or who propose to manufacture, Fancy molasses, to give briefly the method found to be most satisfactory in the above investigations. The juice as it comes from the mill is received in clarifiers, where it is heated for the purpose of coagulating, as far as possible, the albuminoids. From the clarifiers the juice is allowed to flow into settling tanks. From the settling tanks the partially clarified juice is run into an evaporator where as much as possible of the scum, as it rises, is removed. The juice is then evaporated to a density of 20° Beaumé, passed through sand filters, and then into the finishing evaporator, care being taken to remove the scum as rapidly as it is formed. It is, however, fair to mention, that the syrup is only concentrated to 35° Beaumé hot, and that therefore the inversion required is not as great as in Barbados, where it is usually 38° to 40° Beaumé hot.

\* Estimated.



As the West Indian planters will in all probability have to compete to some extent with manufacturers in Georgia and Florida, who will, no doubt, as the industry increases, ship their syrup to the Eastern States, they should as far as possible, perfect the manufacture of their molasses, so as to be at least able to hold their own in the competition.

## SUGAR INDUSTRY.

### Sugar Crop of Trinidad.

The sugar crop of Trinidad for the year ending June 30 last, shows a considerable decline as compared with that of the previous year.

During the year, eighteen factories were in operation and the returns show that they dealt with 562,865 tons of cane, obtaining a yield of 50,564 tons of sugar. This represents a falling off of nearly 20 per cent. as compared with the yield of 1905-6, which reached 62,975 tons.

Further, it appears that there was also a decline, compared with the previous year, in the amount of sugar yielded from a given weight of cane. In 1905-6, 10.01 tons of cane gave a ton of sugar, whereas last year, 11.12 tons of cane, or an increase of 22 cwt., was required to produce a ton of sugar. The amount of grey crystal sugar shipped from Trinidad last year, however, was greater than that exported during 1905-6.

Of the total tonnage of canes ground, 71 per cent. was produced by estate owners, and the remaining 29 per cent. by cane farmers.

### Cane Farming in Trinidad.

Details of the cane-farming industry in Trinidad are given in a return recently published in that colony.

In 1898, the first year with which the report deals, it appears that there were 6,150 cane farmers in Trinidad, of which 3,824 were West Indians, and 2,326 East Indians, the aggregate sum paid for their produce in that year being \$203,000. During the eight years following 1898, however, the latter have increased at a greater rate than the former, and in 1906, there were 6,557 East Indian cane farmers in the island, as compared with 5,777 West Indians, making a total of 12,334 engaged in the industry.

Last year these farmers produced and sold to the estates 166,993 tons of cane, for which they were paid \$340,527. The importance of the cane-farming industry to the peasant community is at once apparent from a consideration of these figures.

It is true that the production of farmers' canes in 1906 did not reach the amount yielded in 1905; this, however, is explained by the fact that there was a general shortage in the crop all over the island, and certainly does not imply that there is any decline in the cane-farming industry.

### Sugar Industry of Egypt.

Although cotton growing must be looked upon as the staple industry of Egypt, yet in some parts of southern Egypt the soil is quite unfavourable to the growth of cotton, and it is here that the best results are obtained with the sugar-cane. The sugar interests in Egypt for some years past appear to have been largely identified with the Egyptian Sugar Society,

a company of French origin. On its formation, the Sugar Society bought the only existing refinery, and the monopoly for refining sugar. They bought over competitors' factories as the latter retired, till they became the leading sugar producers of the country, and paid a dividend of 10 per cent.

During the year 1904 several great Parisian sugar speculators failed, and among them the manager of the Say sugar refinery, who had been largely instrumental in the formation of the Egyptian Sugar Society.

The failure of this latter company followed last year. With the assistance of the Government of Egypt, however, it has been re-organized, and hopes are entertained that the industry will now enter on a more prosperous period. At present the annual yield of sugar is about 60,000 tons. It is stated that difficulty has been experienced in finding a market for export, as owing to the remoteness of southern Egypt, it has not been found possible to place the sugar produced on the English market at a profit. It is thought, however, that the present rapid development of the Sudan will create a new market, and Egypt is in a favourable position to secure this customer.

Further particulars are given in the accompanying extract from Lord Cromer's last Annual Report on Egypt:—

After the failure of the Société des Sucres last year, negotiations were commenced to put the company on its feet again. The new company is to begin with increased capital and will endeavour to do business at a less cost by doing away with many excessive expenses. The Government has also fulfilled its promise of helping the company, and has bought a large amount of stock. It is expected that the new company, through its board of directors, will be able to make the sugar business a paying one.

In regard to cane culture, the southern part of Egypt will undoubtedly show good results, but in Central Egypt the high price of cotton has caused a decrease in the acreage usually given to cane.

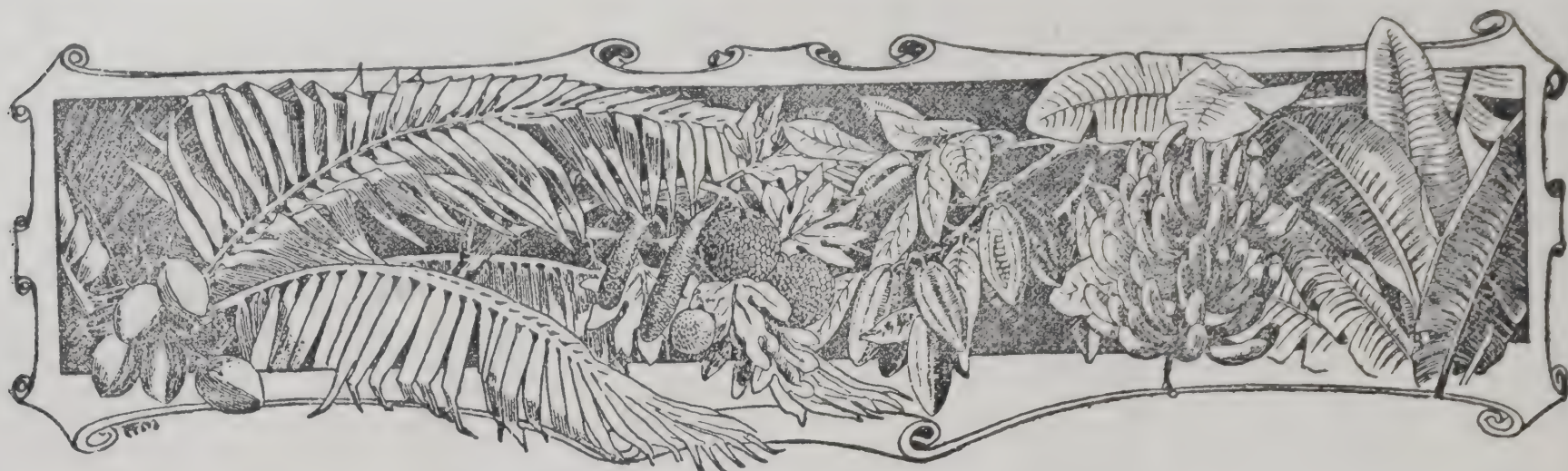
In order to improve the growth of the cane in this country a number of experiment stations will be established to grow the principal grades of cane, and special attention will be paid to reports from other countries on the subject.

### Porto Rico Sugar Crop.

The extension and development of the sugar industry in Porto Rico, which has followed as the result of the free market offered to the sugar producers of the island by the United States, has already been referred to in the *Agricultural News* (Vol. V, p. 259, and VI, p. 211).

The most recent information received from there states that great progress has taken place during the past year, and there has been a considerable increase in the area devoted to the cane, although the planters are practically confined to the comparatively level and limited strip of land on the sea-coast. Not long since, it is stated, the maximum crop which could be yielded by this area was thought to be no more than 150,000 tons, but the crop of the past season is estimated at 220,000 tons, as compared with 213,000 tons in 1906, and 145,000 tons in 1905. The yield of the past season would have been even greater, but for the long drought that was experienced, and which, it is stated, has reduced the crop on many estates by 30 or 40 per cent. About 15,000 or 20,000 tons of the Porto Rico sugar crop will be required for home consumption, and the whole of the remainder will be available for exportation.





## WEST INDIAN FRUIT.

### FRUIT GROWING IN EGYPT.

Cotton has been till quite recently the chief agricultural product of Egypt, but now that attention is being increasingly devoted to the cultivation of this crop in many other countries, the Egyptian agriculturist has found it to his advantage to widen his range of production, and he has discovered that fruit growing (chiefly bananas, oranges, and lemons) for export, promises to be a good source of profit. From an article 'Horticulture in Egypt,' which appeared in the *Gardeners' Chronicle* of July 20, the following particulars are derived:—

Growers of bananas rarely realize less than £60 clear per year per feddan (a little over an acre), and from one plantation of 25 feddans, the owner has this year made a profit of over £2,000. Many bananas are yearly imported into Egypt, so that for home consumption alone there is already a market, but a local market alone could not be sufficient to warrant the institution of a banana industry. Egypt is however more favourably situated than any other country for a banana trade with the Mediterranean, Adriatic, and Black Sea ports.

As compared with the Canary Islands, the cost of transport from Egypt is in most cases less than half. The export trade of Alexandria and Port Said is served by numerous lines of fast up-to-date boats, which daily leave these ports for all parts of the world. The Chinese banana, which fetches the highest price in the European markets, thrives exceedingly well in Egypt, and bears crops equal in weight to any produced in the West Indies or Canary Isles. Clumps planted 10 feet apart annually produce four bunches of fruits, containing eight or ten hands each. Banana cultivation was considerably checked a few years ago by the appearance in the plantations around Alexandria of an eelworm which attacks the roots of the plants. Fortunately this pest has since almost disappeared, and it will probably give little further trouble if a systematic course of transplanting is followed.

The cultivation of oranges and lemons is also capable of great development in Egypt, although for various reasons, progress will probably be slower than in the case of bananas. All the best varieties of oranges are grown to some extent, including the Jaffa, Blood Orange, Mandarin, and Washington Navel, or seedless orange. Lemons and ordinary sweet oranges of excellent quality are grown everywhere. Experimental shipments sent to England have been most favourably reported upon, and have brought excellent prices. As in the case of

almost all kinds of fruits, the orange supply is not sufficient to meet the local demand, and large quantities are imported yearly from Italy, Syria, and elsewhere. Properly managed orange plantations in Egypt yield a margin of £20 per year per feddan, after rent, water tax, and all working expenses are paid. As a rule, however, the methods of cultivation followed admit of great improvement. The majority of trees have been raised from seeds, but the citron (*Citrus medica*), where grafting has been practised, has been largely used as the stock instead of the sour orange. In the month of March, cuttings of the citron are made about 9 inches long, and two buds of the variety to be propagated are inserted in the upper half of each cutting, which is then planted in ordinary soil, care being taken that the buds face to the north and south. About 50 per cent. of the cuttings thus planted form roots, so that it is a quick and easy method of propagation. But such trees are short-lived; they have a bad straggling habit, and produce fewer fruits of poorer quality than those grown on the stocks of the sour orange. During the last ten years the Citrus orange Scale (*Lepidium asperidum*) has spread largely in the orange plantations, and has done much harm to the trees. Although in other countries it has been found a fairly easy matter to keep this pest under by spraying, nothing has yet been done in Egypt to prevent its ravages. The Government, through the agency of the various Agricultural Societies, is, however, now devoting attention to the matter, so that something may be done in the near future to minimise this evil.

### BANANA CULTIVATION IN COLOMBIA.

The United States Consul at Barranquilla in his *Report* for 1906, furnishes the following information as to the condition and prospects of banana cultivation in Colombia:—

The banana industry has developed wonderfully, and although yet in its infancy, it is by far the greatest industry in the district, the output having increased from 171,891 bunches in 1892—the first year of any recorded export—to 1,397,388 bunches in 1906. Practically the whole of the banana exports are shipped to the United States, through Santa Marta. The present area devoted to bananas is about 7,000 acres, of which an American corporation owns 25 per cent., the balance belonging to individuals. All the fruit is purchased and exported by the American company, and the following prices per first-class bunch (nine hands or up) are paid the growers: From the months of August



to January, inclusive, 15c. ; in February, 20c. ; in March, 25c. ; April, May, and June, 35c. ; July, 25c. ; or an average price the year round of 22·5c. It is believed that the general output will be increased 25 per cent. during 1907. For climatic and geological reasons, Santa Marta cannot be said to be a banana country such, for example, as Costa Rica, whose output now exceeds over 8,000,000 bunches per annum, with available fruit lands almost unlimited. Irrigation has to be carried out here during at least seven months in the year ; the lands also require drainage, and the winds often cause serious damage to the crop, but labour is cheap, averaging 50c. per day, and very good results are obtained. These results indeed compare favourably with those of Costa Rica, where winds are practically unknown, rainfall is plentiful all the year round, and the price of bananas reaches 31c. per bunch ; but where labour is scarce, of an inferior quality, and dear, averaging \$1·00 per day. Jamaican labourers are alone available on the Costa Rica plantations, whereas native labour is used almost exclusively in Santa Marta, and is proving satisfactory. The total amount of banana land conveniently situated for irrigation in the whole district of Santa Marta, including Rio Frio and Fundacion, might possibly reach 50,000 acres, but it is very deficient in transportation facilities, and these must be provided before development can be brought about.

### BANANAS.

The London *Daily Telegraph* of June 30 last, publishes a lengthy article in which the methods of banana growing are described, and the valuable qualities of the fruit highly extolled. Speaking of the rapidity with which the banana has advanced in popular favour in England, it is mentioned that while in 1884, the total imports of bananas into England were only 10,000 bunches, during last season one firm alone imported no less than 170,000 bunches in a single week, and there is every prospect of a still further increase in the demand.

The following extract is taken from the article in question :—

In view of the native excellence of the banana and the elaborate care thus expended in bringing it to our doors in perfection, it cannot be wondered at that the British public should regard it as one of the choicest of eatables at all seasons of the year. Sir James Crichton-Browne lately said: 'I wish all our school children could have bananas from time to time. It is not a flavoured fruit, that is to say, a little sugar and water, and a drop of essence thrown in, but a food-fruit, containing in an agreeable form all the essential elements of nutrition. I am quite sure the Jamaica banana, than which there is none finer or better flavoured when of the proper degree of ripeness, is, in the guise of a cheap luxury, a substantial addition to our food supply, likely to commend itself more and more to the working-classes in our large towns.'

The following analysis, showing the composition of the apple, orange, and banana, is by Atwater :—

	Water.	Proteid.	Fat.	Carbohydrate.	Ash.
Apple ...	84·6	·4	·5	14·2	·3
Orange ...	86·9	·8	·2	11·6	·5
Banana ...	75·3	1·3	·6	22·0	·8

A glance at this will make plain the fact that the banana contains more than three times as much proteid as the apple, and twice as much carbohydrate, as well as three times as much fat as the orange.

### WEST INDIAN TIMBER.

West Indian timber, and the conditions and prospects of the timber industry in these colonies, receive the following extended notice in the last *Report* of the U. S. Consul stationed at Trinidad :—

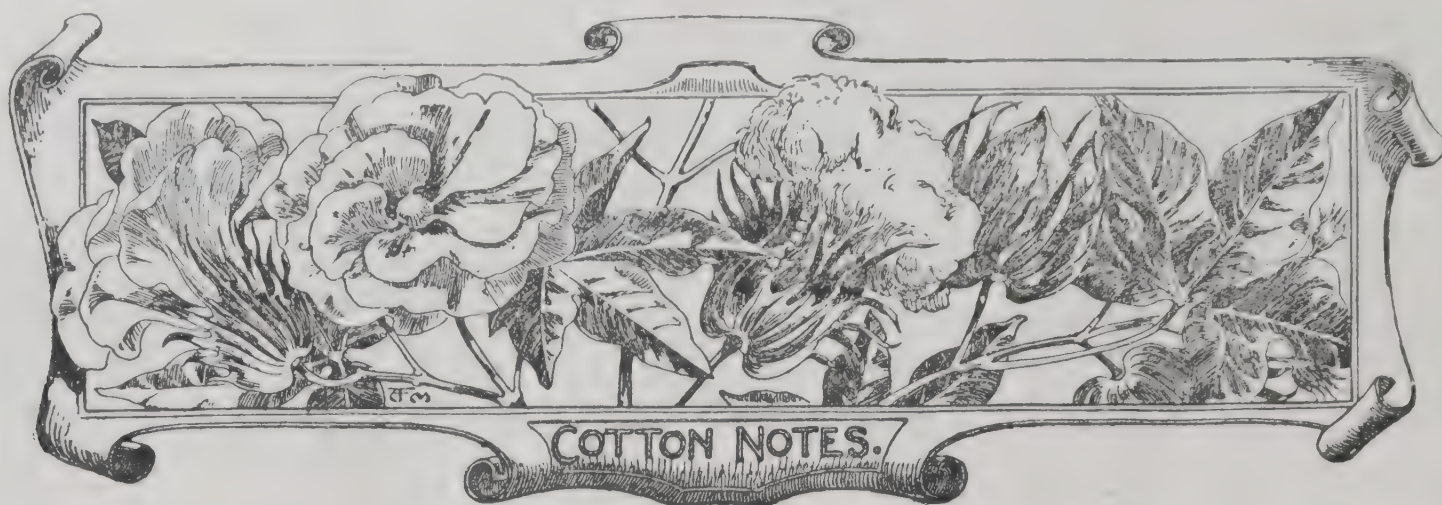
There are about forty species of timber trees in the West Indies which commend themselves as good quality, and which are likely to be heard of in the future. Yet at present, few of the West Indian woods, other than mahogany, cedar, fustic, and logwood, are of much commercial importance. No large logging industry, such as exists in the United States and Canada, seems practicable in the West Indies. It is very expensive to haul timber from the forests to the coasts, and it is not possible to use river transport, because many of the timbers are too heavy to float. Another obstacle is to be found in the fact that the forests in the West Indies do not, with one or two possible exceptions, consist almost entirely of one or two useful species, such as is the case with forests in the north-western States of America. As a rule the individuals of any one useful species generally exist in an isolated state, closely surrounded by single trees of many other species, perhaps more or less useless.

Such conditions stand in the way of a steady supply of any particular timber, without which it is almost impossible to establish a market. This difficulty in finding a market for a new kind of wood is due to the fact that the bulk of the timber trade is limited to a few kinds which every manufacturer keeps in stock. It is more to the interest of the trader to limit his purchases to a few kinds of wood which he can stock largely, and so is able to buy to a better advantage, than to use a large number of woods which must be purchased in small lots. Hence, fresh arrivals stand little chance of obtaining a footing unless they show peculiar merits. Any wood which resembles in some way the staple timber, and will pass under the same name will be readily bought on trial, and, if useful, probably adopted. Thus various similar-looking woods are sold as cedars, mahoganies, or ebonies, and their sole claim to their trade names is often their resemblance in colour and grain to the better-known woods.

It does not seem probable, in the near future at any rate, that there will be extensive planting in the West Indies of timber woods in uniform groves of one or two species, for the hard and heavy woods are usually of very slow growth, and the lighter and quicker growing timbers could not be grown as cheaply as the pine or spruce of the American forests. If there is any planting to be done in the West Indies in the future it will probably be confined to trees which yield valuable products, such as rubber, logwood, balata, and fustic.

Of the many useful woods that are found in Jamaica the most important are cedar, mahogany, logwood and fustic. Very little of the first two are now exported, though the value of the exports of dyewood and logwood extract for the last ten years has averaged \$811,915. In Trinidad there are many valuable woods, but the export is practically confined to cedar, which is shipped to Germany for use in the manufacture of cigar boxes. Formerly mora was also exported. The output of the timber from Trinidad has shown considerable fluctuations. Last year the value of the exports reached \$69,374. The chief forest product of British Guiana is balata, the export of which amounted in 1906 to 517,335 lb., valued at \$181,848. Green heart and mora timbers were exported to the value of \$114,704. The other forest products exported consisted of ordinary lumber, firewood, shingles, hardwood posts, sleepers, etc. A large part of the country is covered with forests containing mostly hardwoods.





### WEST INDIAN COTTON.

Messrs. Wolstenholme & Holland of Liverpool write as follows under date of August 19, with reference to the sales of West Indian Sea Island cotton:—

The market continues quiet for West Indian Sea Island cotton, and the prices are tending easier.

The reports of the American Sea Island crop are now satisfactory, and spinners confidently expect that a lower range of prices will be seen.

The sales include Barbados, 21*d.* to 22*d.*; Nevis, 19½*d.*; St. Croix, 13*d.* to 17*d.*; and a few stains.

### COTTON-WORM IN ST. VINCENT.

Mr. W. N. Sands, Agricultural Superintendent of St. Vincent, in a letter to the Imperial Commissioner of Agriculture, dated August 21 last, makes the following reference to the occurrence of the cotton worm in that island:—

The cotton worm (*Aletia argillacea*) has made its re-appearance on one or two estates this season, and all cotton growers have been advised to closely inspect their cultivations daily, and at the first sign of an attack, to adopt the methods of control found successful in other islands.

The worm was not found here until last season, and then only in small numbers. Its natural enemies such as Jack Spaniards, which are very common in the island, caught and devoured it voraciously. An effort has been recently made to introduce the Jack Spaniards into certain islands of the Grenadines where they are not found, and where the cotton worm does a considerable amount of damage each season.

### IMPROVED QUALITY OF MONTSERRAT COTTON.

In a recent letter to the Imperial Commissioner of Agriculture, Mr. E. Lomas Oliver, who visited the West Indies in October 1904, as a member of the Deputation from the British Cotton-growing Association, and who is also a member of the Council of the Association, writes as follows with reference to the quality of Montserrat cotton:—

Montserrat is, to my mind, the island which has made the biggest strides this season as regards the quality of cotton produced. Either the weather conditions have been perfect, or the seed selection was very carefully done. In former years cotton from Montserrat has been coarse and unripe, and I only bought it for cheap qualities of yarn. This year, however, I have been surprised to find such fineness and regularity of staple, together with good strength.

### SEASONABLE NOTES.

Reports have been received from the various islands, to the effect that the young cotton crop is coming forward in a most promising way. This is very encouraging, for everyone realizes that a good start has a most important bearing on the ultimate results of the crop. The plants, however, must be very jealously watched, and on the slightest appearance of anything which may have an injurious effect on them, prompt preventive or remedial action should be taken.

To appreciate fully the various recommendations made by this Department, it is important that planters should, as far as possible, understand the functions of the various organs of the plant, i.e., the work done towards the nutrition and development of the whole by the different parts of the plant.

The more important parts of the plant which may be interfered with by pests are the roots, the woody portion of the stem, the bark, and the leaves, and each of these plays a very important part in the life of the whole.

The roots form the medium by which the plant is enabled to absorb, in solution, the food elements contained in the soil. These food elements however, cannot be utilized by the plant till they have been conducted in solution through the channels of the woody portion of the stem to the leaves, and there built up, together with other elements taken by the leaves from the atmosphere, into a substance which the plant can readily assimilate. The food so prepared in the leaves is conducted away, and distributed to the various parts of the plant where it is required. Every portion of the plant, even the growing tips of the roots, must receive all its plant food in this way.

It will now be readily seen what effect it must have on a plant when one or more of the above-mentioned parts is interfered with. The removal of the leaves by the cotton worm completely stops the preparation of plant food; the curling and blistering of the leaves by the blister mite prevents them from developing their broad, flat surface; sometimes this takes place to such an extent that there is no semblance of a leaf at all; the effect of this is to limit, to a greater or less extent, their efficiency to prepare plant food. And again, the aphid sucks the prepared plant food from the leaves, thus neutralizing the work of the latter towards the nutrition of the plant.

The action of the soil grub is still more drastic, as it either cuts off the root entirely, or to such an extent, that the materials which the root is able to pass on to the leaves are quite inadequate to support the life of the plant.

The scale insects live on the prepared plant food, which they suck as it passes down the bark to the roots. The nutrition of the roots is thus interfered with, and an enfeebled condition of the latter ensues, resulting in an



inadequate supply of water and food elements to the leaves. The effects of this are seen in the inability of the plant to supply a sufficient amount of prepared food to growing vegetative parts and developing bolls.

The action of the red maggot is also very serious. This insect eats away the young cambium (or layer of tissue between the wood and the bark which gives rise to new wood and bast), as well as the soft tissues of the bark, thus not only preventing any new tissue being formed, but stopping the flow of the prepared plant food. This is not all: the inner woody tissue at the point of attack, becomes disorganized, with the result that the branch breaks off, being unable to support its own weight.

It will be readily seen that each of the pests referred to interferes with the normal action of the parts they attack, and through these, upsets the normal working of the plant as a whole.

These matters have been very carefully considered by the Department, and in offering recommendations for the control of the pests, the individual characters of the insects concerned have been clearly kept in mind, and the cheapest way in which they can be controlled determined by actual experiment.

### WORK OF THE BRITISH COTTON-GROWING ASSOCIATION.

A lengthy article in the *Manchester Guardian*, of June 8 last, gives particulars of recent developments of the cotton-growing industry in different parts of the world, largely brought about by the efforts of the British Cotton-growing Association.

Substantial progress has been made in the extension of the cotton area in East Africa, the variety of cotton grown being the Egyptian.

In West Africa, and more especially in Lagos, the developments are still more remarkable. The present year's crop in Lagos is variously estimated at from 12,000 to 20,000 bales of 400 lb. each, whereas last year the yield was no more than 6,000 bales, and so recently as 1903, only 500 bales were produced.

In Northern Nigeria, where the Association started work only in January 1906, a crop of 1,000 bales was obtained last year, and as much as 3,000 bales may be expected this season. The cotton of Northern Nigeria is whiter in colour, and longer and finer in staple than that of Lagos.

The *Manchester Guardian* refers to the highly satisfactory way in which the cotton from West Africa was baled, as compared with cotton from America. The West African bales also have a greater density, containing about 28 lb. for every cubic foot, as compared with 22 lb. to the cubic foot in American bales. The Association is now putting down patent attachments by which it is ensured that each bale shall contain exactly 400 lb. of cotton.

The following reference is made to the Sea Island cotton industry of the West Indies:—

As far as quality is concerned, it is not too much to say that complete success has already been obtained in the West Indies; it is probable that in no other part of the world, not even in the United States, is cotton being so carefully and scientifically grown as in Barbados and St. Vincent, and the planters are reaping their reward in prices ranging from 20d. to 30d. per lb. There has been a considerable increase, too, in production, and this year's crop will amount to nearly 6,000 bales, with a value of £200,000, a considerable addition to the purchasing power of our West Indian Colonies.

### SEA ISLAND COTTON.

The extracts from Mr. Gordon's paper on Sea Island cotton, started in the last issue of the *Agricultural News*, are continued below:—

At the close of the war, the Savannah merchants worked with energy to retrieve their ruined fortunes, and endeavoured to re-establish Savannah as a Sea Island market, and as they paid good prices for the cotton sent to them, their efforts were successful.

The invention of the sewing machine worked a revolution in the production of Sea Island cotton. It was found that thread made from Upland cotton could not stand the jerk of the sewing machine, and it became necessary to find a substitute. The genuine island cotton was too expensive, and yielded too small a quantity for the use of the trade. In seeking to meet this demand, it was discovered that the level, sandy, pine lands of Georgia would produce a good style of Sea Island cotton of a coarser variety. After some experiments, the Carolina planter succeeded in producing a seed known as 'The Gordon C seed,' or 'Gordon Low Bush' seed, which was very prolific, produced a staple somewhat coarser and shorter than the island cotton, gave a yield of 1 lb. of lint to 3 lb. of seed on the Georgia lands, and yielded per acre nearly as much as Upland cotton. The cotton was found to meet exactly the requirements of the thread men, and as it could be produced cheaply, a large increase in the crop took place.

The effect of the introduction of this cotton upon the Georgia planters was remarkable. In a few years these men rose from a state of extreme poverty to comparative independence.

As the production of Sea Island cotton has increased, new uses for it have been found. Originally, its cost restricted its use to those who spun yarns for the finest laces. Without interfering with this trade, which continues to the present day, the lower grades were found to be suitable for the manufacture of sewing thread, and they became the staple raw material for the thread manufacturers. Sea Island cotton is also used in the manufacture of fishing lines, boot laces, the finest mercerized fabrics, electrical tape, government mail bags, sails for racing yachts, and cloth for bicycle and automobile tires. At first it was spun only in England and in France, but it is now spun all over New England, and even the Southern States are beginning to take a share of the crop.

As has been stated above, Sea Island cotton is a long-stapled, black-seeded cotton. It seems to be affected by the sea air, and does not thrive when planted at a great distance from the coast, although cases have been known where it has been advantageously produced a hundred miles inland. Experience shows that the quality of the mainland cotton deteriorates unless fresh seed is imported from the islands every third or fourth year. The length of this Georgia and Florida staple averages about  $1\frac{5}{8}$  to  $1\frac{3}{4}$  inches. The soil best suited for Sea Island cotton is what is known as a sandy loam. Where clay comes too near the surface, the plant grows large, but produces little fruit.

The season for planting varies widely in different districts. The planters on the Carolina Islands take far more pains in preparing their land, working it, and gathering and marketing their crop than do the farmers of the mainland, but as the latter produce the largest portion of the crop, it may be of interest to describe their method rather than that of the Island planters.

(To be continued).



## EDITORIAL NOTICES.

Letters and matter for publication, as well as all specimens for naming, should be addressed to the Commissioner, Imperial Department of Agriculture, Barbados.

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# Agricultural News

VOL. VI. SATURDAY, SEPTEMBER 7, 1907. No. 140.

## NOTES AND COMMENTS.

### Contents of Present Issue.

The editorial contains particulars of the progress of the 'Fancy' molasses industry in Barbados during the last three years, and details are also given of experimental work carried out under the auspices of the U.S. Department of Agriculture, with a view to determining the best methods of production of high-class table syrup.

Notes on the sugar industry in Trinidad, Egypt, and Porto Rico appear on p. 275.

The growing of fruit for export in Egypt, which appears to be an industry with good prospects, is discussed in an article on p. 276, and on that page also appears an article on banana cultivation in Colombia.

An interesting U.S. *Consular Report* on West Indian Timber is reproduced on p. 277.

The pages devoted to the cotton industry (278 and 279) contain notes on conditions in St. Vincent and Montserrat, as well as on the work of the British Cotton-growing Association. The conditions of life of the plant are discussed under Seasonable Notes, and a continuation of Mr. Gordon's paper on Sea Island cotton also appears.

A brief illustrated article on two good types of Spraying Machines is given under 'Insect Notes' (p. 282).

### Improvement of West Indian Sheep.

With a view to improving the breed of woolless sheep—probably of African origin—now common in the West Indies, steps are being taken by the Commissioner of Agriculture to import from the Colony of Lagos four fine rams, of a type which received high commendation at the Lagos Agricultural Show, as well as two fine native rams, of the largest size obtainable in Gambia. Sir Alfred Jones has kindly consented to assist by arranging for their conveyance from West Africa to Liverpool, free of charge.

### Bananas in Bermuda.

The Governor of Bermuda mentions in his latest report that owing to representations made by the Superintendent of the Public Gardens, and to the recommendations of Sir Daniel Morris, Imperial Commissioner of Agriculture for the West Indies, some attention was given by the Board during last year to the question of establishing an export trade in bananas to New York. The banana grown ordinarily in the Bermudas is the species known as the Canary banana, and trial shipments which have been made have indicated that possibly a lucrative export trade to the United States could be established. The season, however, was not favourable, owing to the long drought, and experimental shipments on organized lines had to be abandoned on that account.

### Coffee Production in India.

From a recently issued return dealing with the coffee crop of India, it would appear that while the exports of coffee from that country steadily increased in quantity and value for several years up to 1905, at the same time the area devoted to the cultivation of the crop, as well as the amount of coffee produced, decreased year by year.

The coffee-producing area is practically restricted to a limited district in the elevated regions near the south-western coast, the coffee lands of Mysore, Coorg and the Madras district of Malabar and the Nilgiris, comprising 86 per cent. of the total acreage under the plant in India.

During the five years ending 1905-6, the coffee exports annually increased, as mentioned above, and while 30,146,480 lb. were exported in 1902, the shipments had reached 40,340,384 lb. in 1905, the maximum quantity since 1888. Last year, however, the exports dropped to 25,546,528 lb.

In spite of the apparent prosperity of the coffee industry, as indicated by the above figures, the returns obtained from planters show that old coffee land is continually being given over for other purposes, while the land newly planted with coffee is very limited in area. During the years 1904, 1905, and 1906, no less than 29,880 acres, till then under coffee, passed out of cultivation, or were planted with other crops. Meanwhile, the total area of the new lands planted with coffee during this period was no more than 8,316 acres, so that the figures represent a net decrease of 21,554 acres of coffee during the three years.



### Hardwood in San Domingo.

The British vice-Consul at San Domingo states, in his most recent report, that hardwoods such as mahogany, satinwood, and lignum-vitae are found in great quantity throughout the Republic. He is of opinion that a profitable business could be carried out in these woods if scientific and modern methods were adopted to export them, such as laying down Decauville railways, and having up-to-date saw mills. Up to the present there are no suitable saw mills in the Republic, and the logs have to be drawn down to the seaports by oxen, a very unsatisfactory way, since the so-called roads, or rather tracks, become so soft by the heavy rains that the oxen often sink up to their middle in mud, and the carts have frequently to be abandoned till assistance can be obtained to dig them out.

### Balata and Rubber in British Guiana.

From the *Annual Report*, just issued, it appears that the production of balata is well on the increase in the North-Western district of British Guiana, 149,342 lb. having been shipped in the past year, as compared with 96,040 lb. in 1905-6. Illicit bleeding of the trees, however, is stated to be carried on to such an extent that the forests are being destroyed by the practice.

It is also reported that the rubber industry has taken a firm hold on the district, and young trees, chiefly of the native variety, *Sapium Jenmani*, are being planted in large numbers. Young plants are expensive, however, and this, it is said, retards the extension of planting operations.

The Government have in contemplation the establishment of an Experimental Rubber Station in the North-Western district, and this should certainly act as a stimulus to the development of the industry.

The rate of growth of trees planted some time ago appears to show that the lands of the district are well adapted for rubber cultivation.

### Coffee Trouble in Brazil.

The 1906-7 coffee crop of Brazil has reached 19 $\frac{3}{4}$  million bags, or nearly double the amount produced in 1905-6, when the yield was only 10 $\frac{3}{4}$  million bags. In response to the urgent demands of coffee planters that something should be done in order to avert a ruinous drop in prices, the Brazilian Government decided to buy up, and to hold, the excess of the season's crop over the normal amount produced, charging a duty of 2s. 6d. per bag on all coffee exported from the country, in order to pay the interest on loans, and to raise the charges for carrying the coffee.

When this scheme was first brought forward it was thought the crop was no more than 12,000,000 or 13,000,000 bags, but now, instead of having to buy up only 2,000,000 bags, the Government are said to have bought up 8,000,000 bags of coffee, representing a value of £15,000,000. Trouble has thus been averted for the present, but the Brazilian planter is naturally anxious as to future developments, which will be decided by the extent of the coffee crops of the next two seasons.

### Scientific Instruction in Rum Making.

In view of the success which has attended similar work in the past, a three-weeks course of instruction in the scientific principles underlying rum manufacture is being given at the Government Laboratory, Hope, Jamaica. Nine distillers are going through the course, and they receive daily lectures from the Island Chemist or the Fermentation Chemist, and also attend practical demonstrations in the distillery and the laboratories.

The Governor of Jamaica, Sir Sidney Olivier, opened the course by an address to the students, in which he pointed out that the work done on rum at the Government Laboratory was quite original, and had gone a long way in clearing up the nature of the processes which occur in the manufacture of rum. He was glad, on behalf of the Government, that the invitation to attend the course had met with such a good response, as it implied that distillers were beginning to appreciate the value of scientific knowledge of ferments and the processes of fermentation, as applied to rum manufacture, and this increased knowledge was bound to result in increased efficiency in their work.

### Portland Cement as a Trinidad Industry

Portland cement is increasingly in demand in Trinidad, the imports of this material during the first nine months of 1904 being 55,930 barrels, having a value of £17,272. Since two extensive deposits of limestone of good quality occur in the island, and it is stated that supplies of marl and of dredger sludge, both of a clayey character are also available, the question has been raised as to whether a fair quality of Portland cement for local use could not be made by a suitable combination of the limestone and either marl or dredger sludge. Analyses of the above materials have been made by the Government Analyst, and samples were also sent to the Imperial Institute, London, in order that their suitability for Portland cement manufacture might be reported upon.

Professor Dunstan's report states that various trials were made at the Imperial Institute, and the results show that cement of good quality could be manufactured from the materials sent. The samples of cement prepared in London set well in a comparatively short time, and a test block prepared and subjected to tension in a testing machine was found to break under a stress of 550 lb. to the square inch. The best qualities of Portland cement have a tensile strength of 600 lb. to the square inch.

The report recommends that in order to obtain the best results, the materials should be mixed in the proportion of 5 parts of limestone to 4 parts of marl. A cement from such materials would contain the maximum amount of lime usually permitted in specifications for Portland cement and would at the same time give the best results obtainable with these materials. The mixture, to which a small quantity of water has been added, is ignited for a considerable time at a very high temperature, and afterwards ground to a fine powder. The material so prepared, it is stated, would be suitable for all purposes to which cement is applied.





## INSECT NOTES.

### Spraying Machines.

Enquiries are frequently received at the Head Office of the Imperial Department of Agriculture as to which are the best forms of machine for use in applying insecticides as a spray, in the West Indies.

Illustrated articles relating to several good types of sprayer have appeared in previous numbers of the *Agricultural News*, and two of these machines are again briefly described here.

The 'Fruitall' sprayer is a tank or barrel sprayer. This style of machine is adapted for the spraying of larger plants and is used by two or three men, one of whom works the pump, while the others direct the spray.



FIG. 20. 'FRUITALL' SPRAYER.

In Fig. 20, the pump is shown in place in the barrel. A feature of this pump is the powerful agitator which is provided for keeping the spray-fluid well stirred during spraying. The 'Fruitall' is large enough to supply two lines of hose, and by the use of extension pipes 8 or 10 feet long, with a nozzle at the end, the spray may be applied to trees of considerable height.

The barrel sprayers may be mounted in a cart, or on a specially designed truck for convenience in moving from place to place.

The 'Success' knapsack sprayer is very popular in the West Indies, and considerable numbers of the machine are to be found in use in these islands. The 'Success' sprayer consists of a copper tank, having a capacity of 5 gallons, in which is fitted a pump and agitator. A discharge hose and nozzle are provided for distributing the spray. It is carried on the back, and held in place by broad straps which pass in front of the shoulders. In this way the hands are

left free; one hand does the pumping, and the other directs the spray.



FIG. 21. 'SUCCESS' SPRAYER.

The 'Success' may also be used as a bucket pump. In this case the lever and handle are removed and a grip (indicated by dotted lines in the accompanying figure) substituted. When used in this way the sprayer is placed on the ground.

### THE PHILIPPINE MAGUEY PLANT.

In an article dealing with the cultivation of maguey in the Philippines which appeared in the *Agricultural News* of June 29 last (Vol. VI, p. 202), the possibility was mentioned that the 'maguey' plant, described in the report under consideration as *Agave cantala*, might prove to be simply a variety of *Agave americana*, as the two species have frequently been confused by writers on the subject.

In this connexion a letter has been received by the Imperial Commissioner of Agriculture from Lieut-Col. D. Prain, Director of the Royal Gardens, Kew, in which the latter states that samples of the maguey plant have been sent by the Philippine Bureau to Kew, to Dr. Trelease of the Missouri Botanic Gardens, as well as to the Botanic Gardens at Calcutta. At all these centres the plant has been recognized as *Agave cantala*, Roxb., so that there is no doubt as to its identity.

Colonel Prain writes:—

*Agave americana* does not occur as a naturalized plant anywhere in SE. Asia, though it is in one or two of the Botanic Gardens of the East.

Nor is *Agave cantala* a form of the grey aloe of Southern Europe, which in many works has been confused with *A. americana*.

It has not yet been determined where precisely in the New World *Agave cantala* occurs, but doubtless it will turn up one day from some American locality.

In some tomato experiments, recently carried out at the Maryland Agricultural Experiment Station, chemical analysis of the fruits from plants treated with different artificial manures showed that potash has a tendency to produce a fruit with slightly less sugar and more malic acid. Some of the sweetest tomatoes were grown by the aid of phosphates. Nitrogen and potash, when applied together, seem to have the most marked effect on the growth of tomatoes.





## POULTRY NOTES.

### How Food Affects the Quality of Eggs.

The accompanying particulars—abstracted from an article in a recent number of *Farm Life*—as to the influence of the foods consumed by laying hens, upon the quality of the eggs produced, should be of interest to poultry keepers:—

Eggs not only differ in size, but the quality and taste, even of those that are fresh, depend largely upon the breed, the time of the year, and the kind of food consumed by the laying hens. In England, most people must have noticed that when they secure perfectly fresh eggs in the early part of the year, the quality is much superior to that of eggs produced by the same hens later on in the season. This is due to the change in the food of the birds. In the spring, their food consists largely of grain, but later in the year, they daily eat all kinds of insects, and also grass in considerable quantity, and it is well known that these latter articles have a deleterious influence upon the quality of the eggs produced. The popular prejudice in favour of dark-shelled eggs is not entirely without foundation, for these are mostly laid by the slow, Asiatic breeds of fowls, which are too lazy to hunt for insects.

A great deal of the flavour of eggs is due to feeding. We have alluded to grass and insects as injuriously affecting the quality, and if a person wishes to test the matter thoroughly, let him feed a few hens partially on onions, and others on whole wheat grain. It will not take many days of such feeding to impart a decidedly unpleasant flavour to the eggs from hens that have had the onion diet. Only by cooking, however, can this difference be detected. The poor quality eggs may produce strong healthy chicks, provided the hens, in addition to the onion diet, have had a due proportion of grain food. It is in part due to the fact that hens in winter are mainly fed with grain or wheat bran that the chicks born at that time are stronger and more vigorous than those from eggs that are produced after the hens run at large, and when insects are their principal diet. If more wheat were fed to laying hens in summer, not only would the hens lay more, but their eggs would be of better quality than they are if produced from food that fowls are obliged to find for themselves.

### Why Hens Lay Soft Eggs.

Poultry keepers—especially in certain districts—are occasionally troubled with hens which lay soft eggs, i.e., eggs without shells, or only very thin ones. This is usually the result of some error in the feeding, and therefore is practically always a trouble that readily yields to treatment.

The ovary contains the germ of the eggs, which, in the laying hen, enlarges and forms the yolk, and one by one as the germs are ripe for it, they are passed into the oviduct, where development is completed, first by the secretion round it of the albumen or white, next by the thin membrane or

skin that encloses both, and lastly, as the egg approaches the outlet, by the shell, which encloses all.

When eggs are laid perfect in all respects except the shell, this is often due to the fact that the food supplied is deficient in lime—the shell-forming material. If this is so, the remedy is simple and obvious: some calcareous substance must be given the birds, and generally the most convenient will be ground-up shells of some kind, or bonemeal. The latter is known to be one of the finest things possible for making shell, as well as for strengthening the egg-organs.

If the above steps have been taken, but the trouble still continues, it is pretty certain that the egg-producing organs are unhealthy in some respect, in consequence of improper or over-feeding. The egg-organs have been unduly stimulated by the food given, so that they are unable to retain the egg until coated with the shell.

If this is the source of the trouble, laying must be checked by the withholding of food having the slightest stimulating tendency, and by giving an aperient. The food supplied should be small in amount, and consist only of boiled rice, maize or potatoes, and a few peas may also be given.

If this line is followed and the affected hen is shut up in a coop for a few days, care being taken to place a supply of fresh water within her reach, she will soon be all-right again.

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## WEST INDIES IN CANADA, 1907.

With the view of placing Canadian merchants in possession of reliable facts relative to the resources of the British West Indies, and the possibilities for trade between them and the Dominion, the Imperial Department of Agriculture has issued a general handbook for distribution at the exhibitions now being held in Canada.

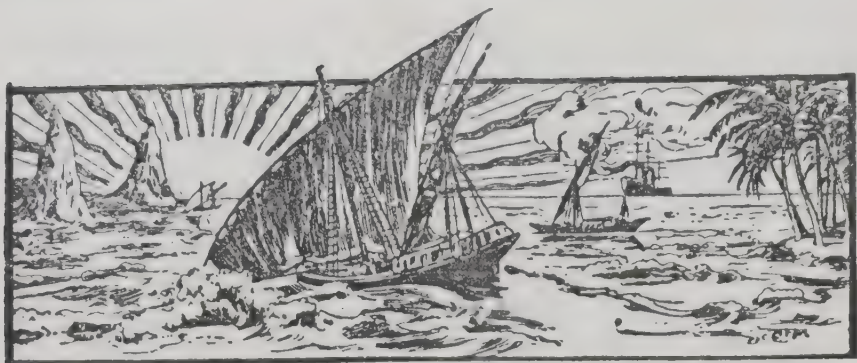
This booklet affords information in regard to the considerable resources of the West Indies, and gives details of the products that will be on view at the exhibitions.

The value of the West Indian exports to Canada, in the year ended June 30, 1906, amounted to £1,566,993, while the value of Canadian imports into the British West Indies was £676,266; thus making a total trade between the two countries of £2,243,259. It is, however, expected that the recent visit of the Canadian Trade Delegation (the report of which is reprinted as an appendix to the handbook for 1907), to ascertain in what respects business relations between these portions of the British Empire are capable of being more fully developed, together with the samples of West Indian products sent to the Canadian Exhibitions, may be the means of still further extending this trade.

The trade is already considerable, but there is abundant room for expansion, especially in regard to shipments of sugar, molasses, cocoa-nuts, cacao, coffee, fresh fruits, spices, and other tropical produce.

A similar booklet was issued for distribution at the exhibitions that were held at Toronto and Halifax in August and September of last year, and it may be remembered that a teacher in Canada asked for a supply of these handbooks to enable him to give one to each of his pupils. It is hoped that the information which has just been issued in the handbook for 1907 will be as fully appreciated as was that published in 1906, and that the introduction of illustrations will afford valuable assistance to the people of Canada in understanding more fully the products of the West India Islands.





## GLEANINGS.

In 1906, for the first time, the value of the bananas exported from Costa Rica, £912,746, exceeded that of the coffee—£690,649.

During the last four years the consumption of sugar in England has increased by 132,200 tons, and in America by 199,000 tons, in round numbers.

Experiments in the cultivation of camphor in Algeria have shown that the trees grown there contain as much camphor as those produced in Formosa. (*Messrs. Schimmel & Co.'s Report*, April.)

Cocoa-nuts to the number of 10,600,042 were exported from Jamaica during the official year 1906-7, this being an increase of 3,499,082 nuts over those exported in the previous year.

The Cuban Agricultural Department reports that cane planting is going on successfully in various parts of the island under most excellent weather conditions. In one province (Pinar del Rio) all mills have finished grinding, and much cane is being planted.

The sale, to a purchaser at Santa Cruz, of the jack donkey at Skerretts, Antigua, belonging to the Imperial Department of Agriculture, has been cancelled, and the animal has been resold, for £60, to Mr. E. D. Dew, a planter in Antigua.

Next to tea the various products of the cocoa-nut palm are the most prominent articles of export from Ceylon. Owing to the drought experienced last year, however, the crop was a poor one, but it is stated that the great rise in price of copra and cocoa-nut oil quite compensated for the reduced yield.

The Imperial Department of Agriculture has decided to continue the control of the Central Cotton Factory in St. Vincent for another ginning season. Efforts to form a local company to purchase and work the factory this season on co-operative lines have not been successful.

Copra, which, in 1905 was worth about £12 per ton at Tahiti, Society Islands, increased in value to about £20 per ton by July 1906. This is stated to be due to the failure of the cocoa-nut crops in many of the copra-producing countries of the Indian ocean, and also to a greatly increased demand for cocoa-nut butter in Europe. The prospects for growers are still reported to be good. (*British Consular Report*, 1906.)

During the year 1906, the export of arrowroot from the Bermudas amounted to 9 tons, valued at £1,240, as against 5 tons, valued at £840, exported in the previous year.

A plant of the Mangosteen (*Garcinia Mangostana*) is fruiting in the Botanic Gardens, St. Vincent. Although planted in 1890, it had not fruited previously.

A very fine stud pony has been imported from England for the Government Stock Farm in Tobago. It is stated that the cost of the animal was £300. (*Port-of-Spain Gazette*, August 21.)

Professor Ronald Ross, F.R.S., of Liverpool University, has been granted five months' leave of absence to enable him to report to the Colonial Office upon measures for the prevention of malaria in Mauritius.

In the last annual report of the Government Chief Veterinary Surgeon for South Africa, it is stated that Anthrax has been, and is still being, the cause of heavy losses among cattle and sheep in the different colonies. Inoculation with Pasteur's Vaccine for protective purposes is being carried out on a large scale with the flocks and herds by the staff of veterinary surgeons in the various districts, and this is reported as being attended with the most satisfactory results.

At a recent meeting of the Board of Management of the Jamaica Agricultural Society, it was reported that if the effort to establish cotton cultivation in the parish of St. Andrew gave promise of success, any financial assistance required would be obtained from England. An area of 60 acres is to be planted, together with another 60 acres in lots, to be worked on the co-operative system by small cultivators. (*Demerara Daily Chronicle*, August 23.)

The Bureau of Animal Industry of the U. S. Department of Agriculture has been collecting information regarding the relative proportions of the two sexes of pigs at birth. The reports received were obtained from eighty-two breeders in all parts of the States, and related to eight breeds. Records were kept of 1,477 litters comprising 13,285 pigs. Of this number 6,660 were boars and 6,625 were sows. For all practical purposes therefore, the two sexes were born in equal numbers, although the exact figures are 201 boars to 200 sows.

Mr. W. N. Sands, Agricultural Superintendent of St. Vincent, reports that agricultural operations are now in full swing in the Carib country of the island, and a good area of the devastated lands is being reclaimed. Besides a large acreage of sugar-cane, arrowroot, pigeon-peas, etc., 100 acres of Sea Island cotton have been recently planted. So far the labour supply has been quite satisfactory and labourers have come forward from all parts of the island, anxious to obtain work in the district.

According to the *Port-of-Spain Gazette*, the prospects for the rice crops of the present year in Trinidad are excellent, should the weather conditions continue satisfactory, and it is expected that the yield will be the largest that has been obtained for a great number of years. The *Gazette* comments upon the waste attendant upon the primitive method of 'pounding' the paddy at present in vogue among the growers, and points out that great saving would follow the introduction of a few small American rice hullers.



## DISEASES OF COCOA-NUT PALMS AT TRINIDAD.

The report of the Mycologist on the staff of the Imperial Department of Agriculture on fungus diseases of cocoa-nut palms in Trinidad has been reprinted as Society Paper No. 247 in the *Proceedings* of the Agricultural Society of Trinidad and Tobago, for public distribution.

This report gives descriptions of three diseases affecting cocoa-nut palms at Trinidad together with the remedial measures that have been suggested for trial. A summary of this report was published in a previous number of the *Agricultural News* (Vol. VI, p. 75), and lately, information has been obtained which indicates that the suggested remedial measures, where thoroughly and conscientiously carried out, have given satisfactory results (*Agricultural News*, Vol. VI, p. 250).

It is now possible for all those interested in cocoa-nut planting in Trinidad to obtain copies of the report giving information in respect to fungus diseases, and it is hoped that the adoption of remedial measures will be systematically carried out on all cocoa-nut plantations.

## CACAO DISEASES AT TRINIDAD.

At the regular monthly meeting of the Management Committee of the Agricultural Society of Trinidad and Tobago, Mr. O. W. Barrett, who has recently been appointed to investigate matters concerning cacao in Trinidad, submitted a preliminary report on the diseases affecting cacao cultivation in that island.

The report stated that most, if not all, of the estates in the island suffered losses from diseases, and suggestions were made that every cacao planter should give trial as to the effect of, (a) spraying with Bordeaux mixture, (b) removal of all diseased pods, and (c) the sanitary treatment of wounds.

The adoption of sanitary methods in cacao cultivation has repeatedly been brought forward in the *Bulletin* of the Botanical Department of Trinidad, and in the publications of the Imperial Department of Agriculture, and an article by Mr. Herbert Wright, late Controller of Experiment Stations in Ceylon, published in the *Tropical Agriculturist* for August 1905, shows that the fungus causing the 'canker' disease of cacao in Ceylon can be successfully kept in check by rational agricultural methods.

From the account of Mr. Barrett's report, given in the *Port-of-Spain Gazette* for August 21, it would appear that 'canker' is probably the most serious disease of cacao in Trinidad, and that possibly there were several kinds of 'canker' present.

Remedial measures, such as those suggested above, or in the report of the Mycologist to the Imperial Department of Agriculture, on canker in Trinidad (*Agricultural News*, Vol. VI, p. 266), are based upon experience in Ceylon and elsewhere, and therefore, the necessity for immediate and continued efforts against attacks of cacao diseases is obvious.

As the practical man requires an authentic case of the results that have been obtained, it may be stated that in Ceylon, 'in 1902, cacao was very badly diseased, as many as 96 per cent. of the trees, and 14 to 62 per cent. of the pods collected being attacked by the fungus.' Curative methods were commenced in May 1902, and during the year the percentage number of pods attacked by fungus was 35; in 1903 this was reduced to 7 per cent. and in 1904 to 4 per cent., by an expenditure that was more than covered by the value of the increased crop. (*West Indian Bulletin*, Vol. VII, p. 302, from the *Tropical Agriculturist*.)

## CAMPHOR GROWING IN MALAYA.

As the camphor plant does not fruit until it is thirty or forty years old, it is important to learn how it can be propagated by cuttings, and it is stated, in the Report for 1906, of the Director of Agriculture in the Malay States, that experiments in this direction were made during the past year. The first trial of some thousands of cuttings, however, was not successful, owing to lack of supervision, but more have been struck, and it is hoped that a stock of young plants will be produced in this way.

While not recommending that the cultivation of camphor should be taken up over large areas, the report points out that the price of camphor is exceedingly high, and there is an excellent promise of good profits. The growth of the trees at the Experiment Station is most encouraging, and compares very favourably with trees of the same age in Ceylon, though the latter are grown at higher altitudes, which are supposed to be more suitable for camphor cultivation. Some three hundred trees at the Experiment Station, growing only a few feet above-sea level, attained a height of 12 to 14 feet in two years.

## TOBACCO GROWING IN CEYLON.

As will be seen from the following extract from the last *Annual Report* on Ceylon, considerable attention is given to tobacco growing in that colony:—

Tobacco is extensively grown in the Northern Province, and also in the Dumbara Valley of the Central Province, and in the Trincomalee District. In the Jaffna District, the area under cultivation is estimated at 7,000 acres. The plants are irrigated with water from wells of from 20 to 25 feet in depth, by means of well sweeps, worked by coolies, and so are largely independent of the rainfall.

The crop of 1906 was heavier than usual, but the supply exceeded the demand, and there was consequently a general fall in price. The future of the cultivation depends, to a great extent, on the finding of new markets for export. At present practically the whole of that exported (4,400,000 lb. of manufactured tobacco in 1906), is shipped to Cochin and Travancore. Experiments in improved means of curing are being undertaken. The great proportion of that grown is consumed locally.

## TOBACCO EXPERIMENTS IN BERMUDA.

Hopes have been entertained of establishing a tobacco industry in the Bermudas, but as will be seen from the accompanying extract from the *Report* on the colony for 1906, the immediate prospects are not very hopeful:—

During the year the Legislature placed a sum of £700 at the disposal of the Board of Agriculture to enable the latter body to continue the experiments in the cultivation of Sumatra wrapper tobacco on a larger scale than in the previous year. Owing to an unusually long drought the experiment had to be abandoned after more than half of the amount voted had been expended.

There is little doubt that wrapper tobacco can be grown in Bermuda, and cured successfully, but unless the process of curing be undertaken by a syndicate with sufficient capital, and the tobacco leaf be purchased by the syndicate, from the growers, there is small chance of establishing an industry in this product.



## JIPPI-JAPPA HAT INDUSTRY IN JAMAICA.

The manufacture of jippi-jappa straw hats in Jamaica, to which reference has been made in past numbers of the *Agricultural News* (Vol. IV, p. 113, and Vol. V, p. 233), promises to develop into an industry giving employment to large numbers of women. The hats made are good substitutes for the well-known 'Panama.' According to the following extract from the last Annual Report on Jamaica, progress appears to have been made during the past year:—

Among the local efforts to develop manufacturers of articles for export, or for the supply of local demand (in addition to the sugar factories, and the new logwood factory in St. Elizabeth), may be mentioned the continued growth of the jippi-jappa hat industry. The plant [*Carludovica Jamaicensis*] which produces the straw for this manufacture grows readily in most parts of the island, and in several places classes for instruction in hat making have been established, which promise to encourage a remunerative hat industry for women. The demand for the hats, however, still considerably exceeds the supply.

## JAMAICA'S LOGWOOD INDUSTRY.

In response to a request by American manufacturers, the U. S. Consul at Kingston has obtained authentic statistics in relation to the logwood industry of Jamaica, and a report on the subject has been issued, from which the particulars given below are extracted.

The Jamaican output of logwood represents about one-fifth of the world's supply. The logwood tree belongs to the natural order Leguminosae, and attains an average height of 20 to 30 feet, the trunk having an average diameter of 12 inches. The usual age of the tree when felled is ten years.

The logs are prepared for the market by cutting to suitable lengths for convenient stowage, and by more or less completely removing the bark and inner layer of white wood, which usually runs about to  $\frac{1}{2}$  inch in thickness. The roots of previously felled trees now also form an important article of export. The wood itself when freshly cut is of a handsome reddish-brown colour, but the colour produced from the wood in dyeing is a deep blue-black.

Formerly logwood was principally used for dyeing raw wool and woollen goods, but since the introduction of aniline colours, which have replaced logwood, the latter has been largely used in the leather industry, for which it seems peculiarly adapted. There are also a number of uses for it in textile dyeing, for which aniline colours have not proved their superiority.

For very many years logwood was exported from Jamaica in its crudest state, but within the past few years factories have been established in the island for the purpose of extracting the colouring matter from the wood, and exporting it in casks to the United States, Great Britain, and Germany, where it meets with a ready sale.

There are two concerns in the island devoted to this business, one of which commenced operations about eighteen years ago upon local capital. For the fiscal year ended June 30, 1906, the company exported to the United States \$205,293 worth of logwood extract, and in addition it made large shipments to Great Britain and Germany. The other dyewood extract factory is located at Lacovia, in the parish of St. Elizabeth, another important logwood centre. This factory is controlled by English capital. Since the establishment of this latter factory the consumption of logwood has

considerably increased, with the consequent advantage of higher prices to the growers.

In addition to the dyewood directly consumed by the local factories, large quantities are exported. From the single port of Sav-la-mar more than 10,000 tons per year are being shipped.

## ONION GROWING IN THE BERMUDAS.

It will be remembered that the agricultural industry of the Bermudas is chiefly dependent upon the cultivation of onions, and in a lesser degree, of potatoes and lily bulbs for export to the United States. The last *Annual Report* on the colony gives the following information with reference to the 1906 crop of onions:—

The onion crop was below the average. The failure to dispose profitably of the crop for 1905 no doubt had some bearing on the quantity grown in 1906. The average price per crate for the season was 3s. 9d. as compared with 3s. 2d. in 1905. Some of the early shipments, between March 11 and April 4, realized 8s. 3d. per crate. After the latter date the price fell gradually until the middle of May, when the price per crate was 1s. 6d. Owing to the presence of Texan onions in the New York market, the value of the Bermuda onion crop now depends on its maturity at an early date in the year, and efforts are being made to secure seed that will produce an early crop. The quantity and declared value of onions exported during the year were as follows:—239,064 crates and 242 barrels, of a declared value of £44,776. The export in 1905 was 399,916 crates and 137 barrels, of a declared value of £62,465.

## MOLASSES AS A CATTLE FOOD.

The recently issued Bulletin No. 81 of the Texas Agricultural Experiment Station describes a series of experiments carried out at the station in the fattening of cattle with different kinds of foods. The results obtained in connexion with the use of molasses as a feeding stuff are thus summarized:—

In our experiments the addition of molasses to a fattening ration has always produced an increased gain in live weight per day.

Addition of molasses to a ration of cotton seed meal and hulls lowered the cost of the gains in weight.

When molasses was added to a balanced ration, (i.e., a ration containing albuminoids, carbohydrates and fat in proper proportions), it gave larger gains, and improved the appearance of the cattle, but did not lower the cost per lb. of the gains in live weight.

There was no undesirable result from feeding yearling steers with 1 gallon of molasses each day, and there is good reason to believe that larger amounts might be used.

The advantages of a well-balanced ration, in which the albuminoids bore the right proportion to the carbohydrates and fat present, were demonstrated by the fact that in the experiments, the increases in live weight, produced at the least cost of feeding stuffs, were obtained with the lot receiving most nearly a perfectly balanced ration.

From the results obtained it was estimated that molasses is worth from 3c. to 30c. per gallon for feeding to cattle. It had a feeding value of no more than 3c. per gallon when added to a ration already balanced, while a value of 30c. per gallon was attributed to it, when, in the early period of fattening, it was added to a ration rich in albuminoids but deficient in carbohydrates.



## RUBBER EXPORTS FROM PARA.

The British Consul at Para, Brazil, in his most recent *Report* (1905-6), makes the following reference to rubber production and exportation:—

Rubber still forms the staple article of production and export. During 1906, exports show an increase of 914 tons over the quantity exported during the year 1905. The increased demand for rubber has tended to keep the price of this commodity in both the American and European markets at quite an exceptionally high figure—over 5s. per lb. This has naturally benefited all rubber producers. Keenness has been shown in trying to manufacture as much as possible. There seems no reason why prices should not continue to maintain their present high standard, since the output of rubber from other producing centres has not so far affected the Brazilian qualities.

Several rubber estates have recently been offered for sale. Investments, however, in such properties are of a speculative nature, and should be examined with caution.

## A SUBSTITUTE FOR WEEDING IN RUBBER PLANTATIONS.

The Malay States have become famous as a great centre of rubber production, and consequently all information from that quarter dealing with the cultivation or manufacture of this product deserves attention. In the last issue of the *Agricultural News* (Vol. VI, p. 270), details were given of the progress of the industry and the extension of the area devoted to rubber trees, and the particulars given below, abstracted from the 1906 *Report* of the Director of Agriculture in the Malay States, should be of further interest.

The question of the growth of weeds among the young rubber trees received attention during the past year. Weeds consume both plant food and moisture, and it is stated that observations showed that their presence markedly lessened the rapidity of growth of the trees in the plantation. One of the most important questions in relation to the economical conduct of a rubber estate therefore would seem to be that of weeding. The cost of this becomes a very serious charge, and is in fact the heaviest expense during the period before the trees can be tapped.

As the result of the observations carried out by the Director of Agriculture, it appears that the expense of weeding may be saved, soil preservation ensured, and the conditions of growth improved, if, instead of allowing the young rubber trees to be subject to the competition of useless plants, some leguminous crop such as peas, beans, clovers, etc., were grown under these trees. The peculiar property of leguminous plants, in virtue of which they are able to absorb nitrogen from the air, and incorporate it into the soil on which they are growing, and so to act as an automatic manurial agent, was described in the last issue of the *Agricultural News* (Vol. VI, p. 267).

The leguminous plant which gave the best results in the observations made in the Malay States during the past year, is the sensitive plant, *Mimosa pudica*, a native of Brazil, and one which should therefore do well in this part of the world.

The mimosa plant grows vigorously, and when once introduced, holds its own against all useless plants and weeds. It seldom grows to a greater height than 18 inches or 2 feet, and another advantage in its favour is that it is peculiarly free from attacks of insects and fungi. The roots of practically all the plants examined were found to possess nodules containing the nitrogenous bacteria, so that soil enrichment is bound to result.

The mimosa does not thrive well in the shade, so that if the branches of the trees meet overhead the sensitive plant will be entirely killed. It is stated that in order to get the largest amount of benefit from the nitrogen-assimilating powers of the mimosa, it is necessary that the crop should be cut down each year, forming a mulch round the roots of the young rubber trees, and then allowed to grow again. The amount of nitrogen added each year to the soil by the presence of the roots of the mimosa plants is estimated at from 150 to 200 lb. per acre.

## RUBBER IN CEYLON.

In an article discussing rubber planting in Ceylon, the *Ceylon Observer* writes:—

The cultivation of rubber-yielding plants (chiefly of the Para, or *Hevea Brasiliensis* variety) has attracted much attention in Ceylon during the past few years, and it is now estimated that there are about 120,000 acres planted with Para (mainly), with smaller quantities of Castilloa, Ceara, or the Landolphia vine, against about 390,000 acres of tea, 34,000 acres under cacao, and about 680,000 acres under the cocoa-nut palm, the last chiefly in the gardens and plantations owned by the natives. Although rubber trees were shown to grow well, and yield profitable returns in the local Botanic Gardens nearly twenty years ago, at that time tea occupied attention so greatly that few planters touched the rubber before 1901, up to which year 2,500 acres in all were planted; by 1904 this was increased to 11,000 acres; early in 1905 to 25,000 acres, and then came the 'rush' which has led to about 120,000 acres being planted by the middle of 1907.

It has been demonstrated that the Ceylon planter can begin to harvest rubber safely when his trees are six years old, the yield increasing annually as a rule, each tree judiciously planted giving from 1 lb. to 2 lb. of prepared rubber.

## THE TAMARIND.

This fine leguminous tree, *Tamarindus indica*, has been grown in India from a very remote period. In a suitable soil it may reach 80 feet in height, and its gnarled trunk and branches somewhat resemble those of the oak.

The foliage is abundant and of a bright green colour; it is formed of compound leaves with ten or twenty pairs of leaflets, the whole having a feathery appearance. Its flowers are borne in short racemes at the tips of the branchlets. The sepals are four in number and are of a yellowish colour; there are three petals marked with pink, and three stamens with combined filaments. The scented flowers contain abundant nectar. Usually, most of the flowers of each raceme drop off, leaving only a few to form pods. The rough thick pods are 3 inches in length or more, brown in colour, and, in the West Indian variety, usually contain four seeds, though sometimes the number is less. A brittle outer skin surrounds the acid pulp; this pulp contains a number of organic acids, and so forms a healthful drink when mixed with water. A good tree will give about 350 lb. of fruit a year.

Tamarinds are used in the East as ingredients of curries and chutneys. They are included in the British Pharmacopoeia on account of their cooling qualities. The tree can be propagated by seeds or by cuttings, and has been used for hedges (*Agricultural News*, Vol. V, p. 357). The wood is hard and heavy, but the heartwood is scanty. The tamarind grows to a great size and age, and old trees are often hollow at the centre.



## MARKET REPORTS.

London,—August 20, 1907. 'THE WEST INDIA COMMITTEE CIRCULAR,' Messrs. KEARTON, PIPER & Co.; August 19, Messrs. E. A. DE PASS & Co.; 'THE LIVERPOOL COTTON ASSOCIATION WEEKLY CIRCULAR,' August 16, 1907.

ARROWROOT—St. Vincent,  $2\frac{1}{4}d.$  to  $2\frac{3}{4}d.$  per lb.  
 BALATA—Sheet,  $2/6$  to  $2/7$ ; block,  $1/10$  to  $1/10\frac{1}{2}$  per lb.  
 BEES'-WAX—£7 10s. to £7 15s. per cwt.  
 CACAO—Trinidad, 102/- to 108/- per cwt.; Grenada, 100/- to 107/- per cwt.  
 CHILLIES—Japanese, fair large red and yellowish, 19/- to 20/-; Zanzibar and Mombasa mixed, 17/6 to 20/-; Sierra Leone, 28/6 per cwt.  
 COFFEE—Jamaica, 53/6 to 82/-; Santos, 28/10½ to 29/- per cwt.  
 COPRA—West Indian, £22 10s. to £23, c.i.f. per ton.  
 COTTON—West Indian, good medium, 7·95d.; West Indian Sea Island, good medium, 19d.; medium fine, 20d.; fine, 21d. per lb.  
 FRUIT—  
 BANANAS—Jamaica, 4/- to 5/- per bunch.  
 PINE-APPLES—St. Michael, 2/6 to 4/6 each.  
 GRAPE FRUIT, none on market.  
 ORANGES—Jamaica, 9/- to 11/- per box.  
 FUSTIC—£4 5s. to £4 15s. per ton.  
 GINGER—good, to good common and ratoon, 69/6 to 74/-; low dark and thin, 62/- to 70/- per barrel.  
 HONEY—18s. to 24s. 6d. per cwt. for dark liquid to yellowish.  
 ISINGLASS—West India lump, 2/- to 2/1 per lb.; cake, no quotations.  
 LIME JUICE—Raw, 1/2 to 1/4 per gallon; concentrated, £24 10s. per cask of 108 gallons; Distilled Oil, 3s. 2d. per gallon; hand pressed, 4/6 per gallon.  
 LOGWOOD—£4 5s. to £4 15s.; Roots, £3 5s. to £4 5s. 6d. per ton.  
 MACE—West Indian, 1/4 to 1/5; broken, 1/-; Penang, bold red, part wormy, 1/10 per lb.  
 NUTMEGS—92's to 86's, 7d. to 7½d.; 115's, 5½d.; 139's to 144's, 4½d. to 4¾d.; 76's to 100's, 2¾d. per lb.  
 PIMENTO—quoted 3d.; Fair, 2¾d. per lb.  
 RUBBER—Fine hard Para, 4s 9¼d.; soft fine, 4s. 7¼d. per lb.  
 RUM—Jamaica, common, 2/7 to 2/10; good, 3/- to 8/-; Demerara, 1/0½ to 1/2 per proof gallon.  
 SUGAR—Crystals, 16/6 to 18/1½; Muscovado, no quotations; Molasses, quiet.

New York,—August 23, 1907.—Messrs. GILLESPIE BROS. & Co.

CACAO—Caracas, 19c. to 22c.; Grenada, 22¾c.; Trinidad, 23c.; Jamaica, 20c. to 21c. per lb.  
 COCOA-NUTS—Jamaica, select, \$33·00; culls, \$20·00 to \$21·00; Trinidad, \$30·00 to \$32·00; culls, \$18·00 to \$20·00 per M.  
 COFFEE—Jamaica ordinary, 7½c. to 7¾c.; good ordinary, 8c. to 8½c.; good washed, 11c. per lb.  
 GINGER—Small to bold scraggy root, 15c. to 15½c.; small to bold bright, 15¾c. to 16½c. per lb.  
 GOAT SKINS—Jamaica, 52c.; St. Kitt's, St. Thomas, and St. Croix, dry flint, 43c. to 48c.  
 GRAPE FRUIT—Jamaicas, \$4·50 to \$5·00 per barrel.  
 LIMES—\$4·50 to \$5·00 per barrel.  
 MACE—no quotations.  
 NUTMEGS—110's, 13c. per lb.  
 ORANGES—Jamaica, \$5·00 to \$6·00 per barrel.  
 PIMENTO—6½c. to 6¾c. per lb.

SUGAR—Centrifugals, 96°, 3·94c. to 3·98c.; Muscovados, 89°, 3·44c. to 3·48c.; Molasses, 89°, 3·19c. to 3·23c. per lb., duty paid.

## INTER-COLONIAL MARKETS.

Barbados,—September 2, 1907.—Messrs. T. S. GARRA-WAY & Co., and Messrs. JAMES A. LYNCH & Co.

ARROWROOT—St. Vincent, \$4·25 to \$4·75 per 100 lb.  
 CACAO—Dominica, \$17·00 to \$18·00 per 100 lb.  
 COCOA-NUTS—\$18·00 to \$24·00 per M. for husked nuts.  
 COFFEE—\$10·00 to \$10·50 per 100 lb.  
 HAY—\$1·80 per 100 lb.  
 MANURES—Nitrate of soda, \$62·00 to \$65·00; Ohlendorff's dissolved guano, \$55·00; Cotton manure, \$42·00; Cacao manure, \$42·00 to \$48·00; Sulphate of ammonia, \$72·00 to \$75·00; Sulphate of potash, \$67·00 per ton.  
 MOLASSES—no quotations.  
 ONIONS—\$2·25 to \$3·50 per 100 lb.  
 POTATOS, ENGLISH—\$1·80 to \$2·40 per 160 lb.  
 PEAS—Split, \$5·90; Canada, \$3·10; Dried, \$7·00 per bag.  
 RICE—Demerara, \$5·90 to \$6·10 (177 to 180 lb.); Ballam, \$5·75 to \$6·00 per bag (190 lb.); Patna, \$3·65 to \$4·00; Rangoon, \$3·00 to \$3·10 per 100 lb.  
 SUGAR—Yellow crystals, \$3·50 per 100 lb.

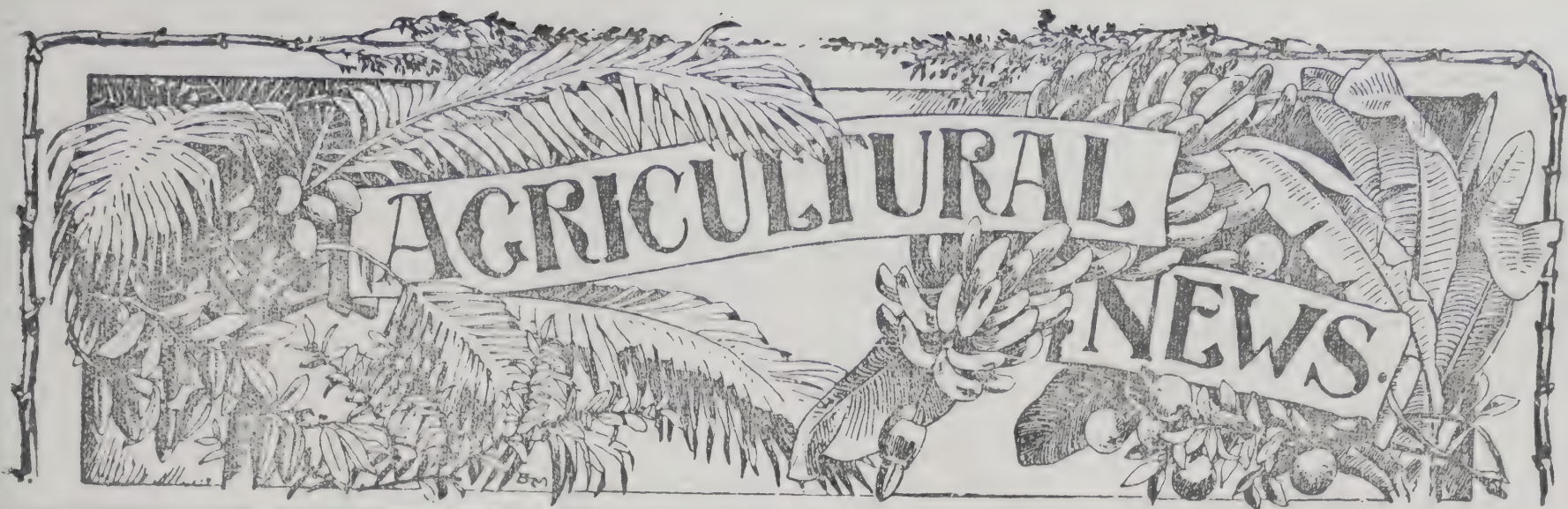
British Guiana,—August 24, 1907.—Messrs. WIETING & RICHTER.

ARROWROOT—St. Vincent, \$10·00 to \$10·50 per barrel.  
 BALATA—Venezuela block, 32c.; Demerara sheet, 48c. per lb.  
 CACAO—Native, 16c. to 17c. per lb.  
 CASSAVA—No stock.  
 CASSAVA STARCH—\$9·00 per barrel.  
 COCOA-NUTS—\$12·00 to \$16·00 per M.  
 COFFEE—Creole, 14c. to 15c.; Jamaica, 13c. to 13½c. per lb.  
 DHAL—\$5·25 to \$5·50 per bag of 168 lb.  
 EDDOS—\$1·68 per barrel.  
 MOLASSES—18c. per gallon.  
 ONIONS—Tenerife, 2c. to 2½c. per lb.  
 PLANTAINS—16c. to 48c. per bunch.  
 POTATOS, ENGLISH—Bermuda, \$4·75 per barrel.  
 POTATOS, SWEET—Barbados, \$1·68 to \$1·80 per bag.  
 RICE—Ballam, \$6·40 to \$6·50 per 177 lb.; Creole, \$5·25 to \$5·50 per bag (ex store); Seeta, \$6·00 per bag.  
 SPLIT PEAS—\$5·90 per bag (210 lb.).  
 TANNIAS—\$2·40 per bag.  
 YAMS—White, no quotations; Buck, \$2·40 to \$3·12 per bag.  
 SUGAR—Dark crystals, \$2·30 to \$2·55; Yellow, \$2·90 to \$3·10; White, \$3·60 to \$4·00; Molasses, \$1·80 to \$1·90 per 100 lb. (retail).  
 TIMBER—Greenheart, 32c. to 55c. per cubic foot.  
 WALLABA SHINGLES—\$3·50 to \$5·50 per M.

Trinidad,—August 24, 1907.—Messrs. GORDON, GRANT & Co.

CACAO—\$23·00 to \$24·00 per bag (110 lb.); Venezuelan, \$23·50 to \$24·00 per fanega.  
 COCOA-NUTS—\$21·00 to \$22·00 per M., f.o.b.  
 COCOA-NUT OIL—\$1·15 per Imperial gallon (cask included).  
 COFFEE—Venezuelan, 6½c. to 7c. per lb.  
 COPRA—\$4·00 to \$4·25 per 100 lb.  
 DHAL—\$4·40 to \$4·60 per 2-bushel bag.  
 ONIONS—\$1·60 to \$1·90 per 100 lb. (retail).  
 POTATOS, ENGLISH—\$1·70 to \$1·90 per 100 lb.  
 RICE—Yellow, \$5·60 to \$5·85; White, \$5·75 to \$6·00 per bag.  
 SPLIT PEAS—\$5·50 to \$5·75 per bag.  
 SUGAR—Grocery grades, \$2·00 to \$3·00 per 100 lb.





## A FORTNIGHTLY REVIEW

OF THE

### IMPERIAL DEPARTMENT OF AGRICULTURE FOR THE WEST INDIES.

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#### Treatment of Cotton Pests.

SINCE the revival of the cotton industry in the West Indies, in 1902-3, all matters that have had a bearing on the proper growth and development of the cotton plant, as well as all the details of preparation of the product for market, have become of extreme importance in the agricultural practices of the West Indies.

In 1903, the Imperial Commissioner of Agriculture

procured from the Sea Islands of South Carolina a large amount of seed of the best Sea Island cotton. Short staple cotton had been grown in the Southern United States since about the middle of the seventeenth century, but the long staple cotton from which the present Sea Island variety was developed, was introduced into Georgia in 1786, from the Bahamas, to which place it had been brought in 1785, from Anguilla.

The earliest settlers in the West Indies and Guiana found cotton growing wild, and they included its cultivation among the first crops grown by them. It is on record that early in the eighteenth century the cotton cultivators of the West Indies were accustomed to the ravages of a worm which appeared in great numbers. The earliest cultivators of cotton in Guiana were familiar with the attacks of the cotton worm (1705-52), and, in the Bahamas, these attacks had become so severe toward the end of the century as to destroy almost the total crop in certain years (1788 and 1794). In 1801-2 many cotton planters left Martinique and emigrated to south-western Georgia on account of the ravages of the cotton worm. In many of the islands the losses were so severe in these years that the cultivation of cotton was abandoned.

The cotton worm was the first of the serious pests of cotton to make its appearance. Then followed cotton stainers, in all the islands, except Barbados; the red maggot appeared in Barbados, in 1904, and later, to a very slight extent, in Montserrat. Aphides occur in all the cotton-growing islands, and certain scale insects also attack cotton in most, if not all these islands; but one of these, the black scale, seems to have made its greatest development as a cotton pest in Barbados.



The publications of the Imperial Department of Agriculture contain a good deal of information relating to cotton pests and their treatment. Papers have appeared in the *West Indian Bulletin* (Vol. IV, p. 268, and Vol. VI, p. 123) on the subject, and brief articles are frequently included in the *Agricultural News* under the heading of 'Insect Notes.' A chapter on cotton pests and their treatment is also included in the *A.B.C. of Cotton Planting*.

The control of the cotton worm is best effected by means of poisons, of which Paris green is most in use. London purple has also been used successfully on a large scale in St. Kitt's and Montserrat.

For the application of Paris green to the cotton plants, the Imperial Department of Agriculture has recommended the use of a bag made of ticklingburg, from which the Paris green is shaken out in a fine dust over the plants. When used in this way the Paris green is mixed with dry air-slaked lime at the rate of 1 lb. of Paris green to 5 lb. of lime. This strength of mixture has been found, by repeated trial, to be effective and economical, and used in this manner and at the strength recommended, Paris green is thoroughly efficient for the control of cotton worm.

The leaf-blister mite has also been a serious pest, and in 1904-5 was the cause of a very considerable reduction in the amount of the cotton crops in Montserrat. For dealing with this pest a mixture of sulphur and air-slaked lime in equal parts has been found useful. Cultural methods have had perhaps a greater influence in keeping the leaf-blister mite under control than the use of insecticides. It has been found that if all old cotton is destroyed some time before the planting of the new crop, the attack of leaf-blister mite is much less severe, and the picking off of infested leaves, as they appear in the fields of young cotton, further helps in keeping the pest within reasonable limits.

In those islands where the leaf-blister mite occurs, it is rarely possible to get a second picking, and the general recommendation made is to destroy the cotton plants as soon as the first picking is completed. The general adoption of these practices has given good results, and now, even though the leaf-blister mite may be present all through the cotton season, it is possible to obtain a satisfactory yield of cotton.

In Barbados, the red maggot has been the cause of considerable loss in the cotton crop on certain estates in certain years. It is noticeable that this insect is rarely seriously prevalent on any estate in two successive years. This also is one of the pests in the

control of which cultural methods play an important part. The early destruction of all old cotton in fields which have been badly infested with the red maggot, and the removal and burning of infested plants and parts of plants during the growing season, are the means of keeping this pest in check.

Cotton stainers, though abundant in all the cotton-growing islands except Barbados, are rarely the cause of serious loss in the cotton crop. These insects have the habit of puncturing the bolls and tender shoots of the cotton plant and sucking out the sap. In the early days of cotton cultivation, cotton stainers, or 'red bugs' as they were called, were extremely prevalent in the Bahamas and some of the West India Islands, and the complete destruction of the cotton crop in those islands in certain years was stated to be the result of the attacks of these insects.

In the West Indies at the present time the most general practice in controlling cotton stainers is to collect them in buckets containing water and kerosene. The insects are shaken or beaten off into the kerosene mixture in which they die.

The cotton aphid, though frequently very abundant, is rarely a serious pest. At times, however, young cotton is so severely attacked that it is found advisable to pull up the plants and replant the fields. Aphid is generally kept in check by its natural enemies, the ladybirds and the lace-wing flies.

Scale insects are more serious pests, and they are most injurious to old cotton which is being kept for a second or third picking, or to young cotton which has been planted in the vicinity of old, infested cotton.

The remedy against attacks by these insects lies in the adoption of clean cultural methods. All old cotton should be destroyed some time before the planting season for the new crop, and on no account should old scale-infested plants be allowed to remain in the vicinity of fields of young cotton.

In considering the remarkable progress of cotton cultivation in the West Indies during the past few years, it must be borne in mind that cotton planters have had many difficulties to overcome, among which have been the attacks of insect and other pests. Those planters who have taken a keen interest in the matter, and have always been on the alert to control insect pests, and to discover their presence before the attacks have assumed serious proportions, are now in a position to deal with any of the recognized insects. The officers of the Imperial Department of Agriculture at Barbados, and the local officers in each island are always ready to give information on all points in connexion with insect and other pests.



## SUGAR INDUSTRY.

### Sugar Industry in Jamaica.

In the last *Annual Report* on Jamaica the reference to the condition of the sugar industry of the island states that during the past few years increased confidence has characterized the sugar industry as a whole, both in the operations of the planters and in the introduction of capital. Good evidence of this is seen in the fact that during the period in question no less than £38,000 worth of new machinery has been imported.

The actual exports of sugar during 1905-6 showed an increase of 40,623 cwt. in quantity, and £5,962 in value, as compared with those of the previous year, but owing to increased shipments of fruit, coffee, etc., sugar had declined from 8.1 per cent. to 6.9 per cent. of the total agricultural exports.

To quote from the *Report*:—

The year records considerable activity in the extension of cultivation, and also in the cheapening of production by improvements in machinery, and by the amalgamation of estates as central factories. In the parish of Clarendon already three factories are in process of formation, and on the north side the establishment of at least two more is being contemplated. Cane farming, i.e., the growth of canes by large or small landowners on lands adjoining sugar estates, for sale to the estates for manufacture, annually takes a more definite place in the industry, and will no doubt prove a very valuable auxiliary for increasing the output of sugar.

The successful working of two recently established Planters' Associations in the island is in itself an encouraging system, seeing how little has been attempted in the way of co-operation in the past, and how much may be effected by discreet combination.

### Labour in Demerara.

An extract from the *Demerara Argosy* relating to the difficulty experienced by planters in obtaining labour for harvesting the cane crop, appeared in the *Agricultural News* of August 10 (Vol. VI, p. 243). It was mentioned that the wages offered to labourers were at the rate of \$3.00 per ton of sugar made, together with certain perquisites.

Commenting on the position of affairs, the *Sugar Planters' Journal* makes the following remarks in reference to the rate of pay offered:—

While we are rather far away from South America to criticise the equity of payment for cane cutting on such a basis, and being naturally prone to judge the matter from the Louisiana point of view, it seems to us that payment on any basis but that of cane tonnage would not be altogether to the labourers' taste, unless it be a fixed daily wage, because of the accepted variance in sugar content of the cane. Under the system indicated above, if the cane be under average in sweetness, the harvest hands are called on to stand a proportionate reduction in wage, a case of 'you cut our ripe cane and we pay you well; you cut our poor cane and get small pay.' With such an arrangement the plantation boasting the richest cane would have a surfeit of labour, and the immature cane would find no hands willing to harvest it.

### Manuring Sugar-cane in the Leeward Islands.

Reference has already been made in the *Agricultural News* (Vol. VI, p. 168) to the results, for 1905-6, of the manurial experiments carried on under the direction of the Imperial Department of Agriculture at Antigua and St. Kitt's, and it was mentioned that the experiments with plant canes have now been brought to a close, after having been carried on for six years in succession, as each year's results clearly indicate that no advantage is gained by manuring the plants with artificials, when they have already been given a dressing of 20 tons of good pen manure.

Manurial trials with ratoon canes are also in progress, but, until the season of 1904-5, these experiments were limited to ratoon canes which had received artificial manures as plants in the previous year. Now, however, that it has been definitely concluded that artificials are not needed by the cane plants, it becomes of interest to investigate the requirements in the way of manures of ratoon canes to which, as plants, no artificials had been applied.

With this end in view, a new series of experiments was started at Antigua and St. Kitts' in 1904-5, and extended during 1905-6 when they were carried out at five different stations. In every case during the past season, there was a monetary loss entailed, the cost of the artificials supplied not having been recovered in the increase of crop. These results are chiefly attributed to the severe drought which was experienced in those islands during the past year, though the good results which seems to have been derived in past experiments from the application of artificial manures to ratoons may have been partly due to the residual effects of the manure given to the plant canes in the previous year. In any case it is not safe to adopt the results of a single season as a guide in agricultural practice, and the manurial needs of ratoon canes will require further investigation before any definite conclusions can be drawn. The new series of experiments will be continued with this end in view.

### Sugar Industry of Formosa.

The sugar industry of Formosa is discussed at considerable length in the last *Annual Report* of the British Consul at Tainan, South Formosa.

The fact that 1,283,793 cwt. of sugar, valued at £848,718, were exported during 1906 as compared with 830,620 cwt., valued at £598,668, exported in 1905, indicates the recent progress that has taken place. By far the greater quantity of these sugar shipments went to Japan.

Mr. A. W. Sanderson, a member of a British firm of sugar machinery engineers, who was lately in Formosa and whose impressions are included in the *Consular Report*, does not consider that sufficient judgement was used in the erection of the factories which have recently been built, since too much money seems to have been spent on elaborate buildings, and not enough on machinery or means for bringing the cane rapidly to the factory, and feeding the mills rapidly. Mr. Sanderson mentions that the cane contains 14 per cent. of fibre on the average, which would ensure steam raising on an economical basis if good megass furnaces were introduced. He also states that the mills as a rule have caused dissatisfaction by not coming up to their rated capacity, which is to be attributed to the hard quality of the cane, and he points out that with cane containing such a large percentage of fibre, a better extraction of sucrose would probably be obtained by the adoption of the 'maceration' process, so much in vogue in modern sugar factories.





## WEST INDIAN FRUIT.

### DATE PALMS AND MANGOS AT TRINIDAD.

The Annual Report (1906-7) on the Royal Botanic Gardens, Trinidad, contains the particulars given below of the experimental work in the growth of date palms (of the Algerian variety) and of different varieties of mangos that is being carried on at the Botanic Gardens, St. Clair:—

#### DATE PALMS.

The plants were imported from Algeria and planted out in 1903 in likely positions at St. Clair. The popular idea that this palm is best at home on a poor soil has been disregarded and they have been given the best obtainable. 'Heads in the sun, and roots near the water' is evidently the best position; and our trees are thriving best in positions which most nearly approach this character. Date trees raised from seed of the best imported fruits are also growing well, and some planted in 1900, being then about two years of age, fruited during the past year, and the fruit was larger and better than that produced by the old garden trees for many years past. If the imported trees are of the right kind, which we have no reason to doubt, it is probable that excellent table fruit will soon be regularly produced. The idea that dates cannot be produced in the West Indies is probably due to the fact that nothing but seedlings have been previously cultivated, and none of these have ever been known to produce fruit of a size fit for table. The school-boy however, finds pleasure in consuming them, and in reality they are sweet and of a good flavour, but wanting in size. In the *Agricultural News*, of May 4, 1907, a report from an Australian source (New South Wales) stated that by planting imported Algerian date trees, good marketable dates have been produced. A further report from California shows that good fruit has been produced by plants imported from Africa. The report states that in consequence of the excellent quality of the fruit and the high price realized, date growing is becoming a recognized industry, and that thousands of palms are being planted.

#### MANGOS.

The mango trees introduced from the East Indies and planted at St. Clair in 1902, have made good growth, but as yet have not produced a single fruit, while trees of the same size and age raised in Trinidad from selected varieties mostly obtained from the French West Indies, have produced

crops for the past three years. Much was expected of this somewhat expensive East Indian importation, but there is as yet nothing to show that any superior variety has been obtained, and the fact that they are not early fruit bearers has clearly been proved. They must be grown to reach the fruiting stage however, before deciding on their general suitability for this climate.

The mango, taking all its varieties, does not thrive well generally in Trinidad, and the quantity of fruit produced is far less than in Jamaica and some other West India Islands. The trees are not prolific bearers, and some kinds are affected with gouty or warty excrescences, apparently caused by some fungus as yet undetermined. Others thrive well, and fruit regularly, but, on the whole, although Trinidad produces mangos of fine quality, the trees are in no way so prolific or so regular in the production of crops as in many other islands. Trinidad, however, possesses a large number of varieties of first-class quality.

### PINE-APPLE PRODUCTION FOR THE ENGLISH MARKET.

The *Field*, of August 10, contained the following paragraph with reference to the home supply of pine-apples, and the sources of these supplies:—

The production of pine-apples in tropical countries, particularly the West Indies and the Malay Peninsula, for the supply of the European market has developed into a large and important industry. They are grown with little outlay as a field crop; consequently they can be sold retail in this country fairly cheaply. For instance, Natal reckons to be able to supply fruit of medium size that can be sold in London to the consumer at a shilling or less. But the fruit that one buys in this country is not always satisfactory; it looks better than it really is, a low-priced pine too often proving worthless, with its core black and uneatable. In Jamaica experiments have been made with the different kinds of pine-apple with a view to improvement in this respect. The varieties that are known to be of the best quality in this country were among those that were tried, but experienced cultivators in tropical countries state that the repeated failure to make the pine-apple business a success in Jamaica is due to the fact that unsuitable varieties are being cultivated. In the Bahamas the cultivation of the pine-apple is one of the chief industries, and it might become of equal importance in Jamaica, where the conditions are such as would favour the growth of fruit of the best quality.



## BANANA INDUSTRY IN THE CANARY ISLANDS.

The last *Annual Report* of the British Consul stationed at the Canary Islands contains the following particulars relating to the banana industry:—

The exports of bananas from the Canaries in 1906 amounted to 2,476,044 packages as compared with 2,578,781 packages in 1905. But the decrease is only apparent, and can be explained by the fact that shippers have been packing a great number of bunches two in a crate with a view to economise freight, since freights are charged per crate and not per bunch. Thus we may take it that the total number of bunches produced was practically the same during 1906 as in 1905.

Exchange has no doubt been a great factor in disorganizing the export trade in bananas and fruit generally. Some farmers were hoping that the fall in exchange would be in their favour, but there were of course no grounds for such hopes, and in the end many of these farmers had to give up their farms, the exporting houses not being able to offer them the old prices for their fruit, and the landowners not consenting to any reduction in the rents. Thus a great many of the farms reverted to the landowners, who in their turn, apparently failed to see that the peseta [a Spanish silver coin worth  $9\frac{1}{2}d.$ ] is worth more than it used to be when exchange was higher. They therefore refused to accept a lower price from the exporter, and began not only to cultivate their farms on their own account, but also to export the fruit themselves.

For the time being, therefore, two classes of men have considerably decreased in number, namely, the farmer and the exporter, the landlord having become his own grower and exporter. The working classes have not suffered by this change, since they are still enjoying the same, if not a higher, rate of wage. In fact there is a larger demand for labour, due no doubt to the landlord farmer who is not in a position to give his full attention to the work, since he has to look after the export in addition to the cultivation. The consequence of these changes is that the quality of the fruit has suffered considerably, and during the summer months whole ship-loads have arrived in very bad condition, the fruit over-ripe, and the packages broken. Otherwise the prices in the British markets have been good for sound fruit, and the West Indian bananas do not seem to have interfered in any way with the ready sale of the Canary product.

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## IMPORTATION OF JAMAICA RUM.

The following order, which should certainly operate to the advantage of rum manufacturers in Jamaica, has recently been issued by the English Board of Customs, after communication with the Colonial Office:—

The Board direct that rums imported from Jamaica, or admitted as being of Jamaica origin, are to be entered in the accounts and on all relative documents, including permits, as 'Rum from Jamaica.' Care is to be taken that this description is not applied to rum from Jamaica which has been blended with rum of other origin.

The effect of this order, says the *Pharmaceutical Journal*, is to differentiate Jamaica rum from all other rums so that a separate entry will be required for it at import. In future it will be impossible to blend Jamaica rum in bond with other cheaper rums, and describe the resulting mixture as Jamaica rum.

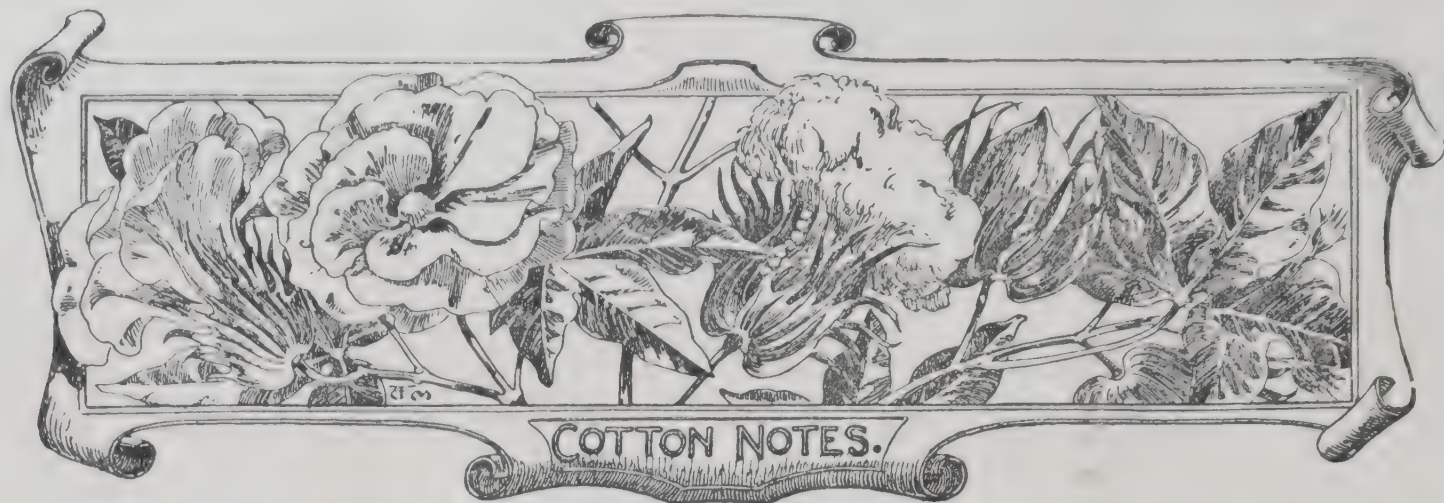
## LIME CULTIVATION IN JAMAICA.

Although Dominica and Montserrat are naturally regarded as the headquarters of the lime industry of the West Indies, yet the fact that the lime juice, citric acid, and essential oil produced in Jamaica is of the annual value of £6,000 indicates the importance of lime cultivation in this latter island. It is stated that the lime does very well indeed in Jamaica, flourishing even in very dry districts and on poor soils. It is mentioned that a good deal of the lime juice exported is the produce of trees grown in the ordinary cattle pastures, and in consideration of this it is pointed out in an article in the *Journal* of the Jamaica Agricultural Society (August), that limes and their products should form a much more prominent item than they do at present in the agricultural exports of the colony, as it is stated that there is plenty of ordinary pasture land in the island possessing a red soil well adapted for citrus fruit culture, on which limes could be profitably grown as a perennial catch crop.

The following account of the prospects of citric acid in the London market, written by Mr. Robert Thomson, is reproduced from the article in the *Journal*:—

In an otherwise quiet market citric acid is the one interesting feature. The market in this article is in an exciting condition, and, especially in view of the demand which will shortly set in for fruit salines and summer beverages, there is every probability of a continued advance in price. To-day English makers are quoting 2s. per lb. for wholesale orders, but possibly a demand for large quantities could not be conveniently met. At the corresponding period last year the price per lb. was about 1s. 5d., so that the advance which has already taken place is substantial. Foreign makes may be obtained at 1d. or  $1\frac{1}{2}d.$  below English makers' quotations. The lowest figure which this product has ever touched is a fraction less than 1s. per lb., while, on the other hand, some thirty years ago it actually advanced to as much as 5s. 6d. per lb. Other products of the lemon are also dearer, and the present quotation for essence of lemon from Messina is 5s. 4d. per lb., but at such a high figure as this business is naturally restricted. The main cause which has contributed to the advance in price of citric acid is the lateness of the Sicilian lemon crop. In normal seasons some of the lemons are ready for gathering in November, but a correspondent who was in Sicily early in the present year informs us that he saw lemons on the trees in January which were still green. The retarded ripening in the present season follows on a crop which last season was below the average owing to inclement weather. There is thus a shortage in the supply of the fruit necessary for the manufacture of citrate of lime and essence of lemon, while, on the other hand, the demand for citric acid on the part of mineral water manufacturers and of dyers, who employ this product as a mordant, is increasing. A supply which is insufficient to meet the demand is itself a good reason for an enhanced price, but such an economic condition is often aggravated by other complications. In the present case owners of citrate in Sicily appear to have made the best of the opportunity afforded, and, having found that the banks are willing to make advances on the supplies of this raw material stored with them, are holding for higher prices. Makers of citric acid seem to be short of raw materials, and, taking all the facts into consideration, there seems to be little likelihood of an immediate decline in value. Indeed, the possibilities appear to lie in the other direction.





### WEST INDIAN COTTON.

Messrs. Wolstenholme & Holland, of Liverpool, write as follows under date of September 2, with reference to the sales of West Indian Sea Island cotton:—

Since our last report a moderate business has been done in West Indian Sea Island. Spinners are well stocked, and have only bought when easier prices have been accepted.

The American Sea Island crop continues to do well, the promise now being for 100,000 bales more. It seems therefore likely that prices will give way somewhat, as soon as the new crop commences to move.

The sales include Barbados, 20*d.* to 22*d.*; Antigua, 19*d.* to 23*d.*; Nevis, 19*d.*; St. Croix, 20*d.* to 21*d.*; and a few stains.

### SEA ISLAND COTTON IN THE DANISH WEST INDIES.

In the course of an address entitled 'The Economic Crisis in the Danish West Indies,' delivered at Copenhagen in January last by Mr. F. P. H. Lorentzen, the lecturer, after describing the depressed condition of affairs generally, made the following reference to the Sea Island cotton industry introduced into those islands by the Danish Plantation Company:—

The Danish Plantation Company owns many estates on all three islands, and mention must be made of the work of the company, the results of which are already visible. Extensive areas of land have been brought again into cultivation, and to a very wide extent new sorts of plants have been introduced.

In this respect special mention must be made of the cotton cultivation which seems to be in course of extensive development. In 1906, there were reaped 377,000 lb. of cotton which were sold for a sum of £7,650. It is the so-called Sea Island cotton which fetches about five times as much as ordinary cotton, and which grows only in certain localities. It is chiefly used for making thread for sewing machines.

The result of this new cotton industry is, that while the company's accounts for 1904 and 1905 showed a very considerable deficit, there is now all reason to hope and expect that the accounts for 1906 will balance. This is an extraordinarily favourable result when it is borne in mind that the working and undertakings of the company were to a very high degree of a mere experimental nature. For 1907 the crop is estimated to about double of that of 1906.

Many other estate owners besides the Plantation Company have gone in for cotton cultivation.

### COTTON PICKERS.

The number of labourers required to pick cotton on any given estate varies considerably, in accordance with the following conditions:—

- (1) The more or less advanced period of the picking season.
- (2) The experience and ability of the pickers.
- (3) The size of the crop being reaped.

It is true that in some districts, where they are well organized and carefully trained, the pickers do more and better work than in other districts.

During the early ripening season, only very few are required, but later, when the cotton is maturing rapidly, and large quantities are ready for gathering at the same time, the number of pickers must be considerably increased for a while; later still, the number may be again decreased.

On some estates during the busy season, more than one picker is engaged per acre, but usually one person per acre is quite sufficient. There are other estates on which no more than one picker to three acres is ever employed.

On seventeen estates situated in the various islands, the average number of pickers engaged, during the last busy season, was two people for three acres of cotton.

### SEASONABLE NOTES.

The great benefit which the cotton plant derives from constant and careful cultivation is recognized by every cotton planter, as are also the poor results which follow careless or neglectful treatment. There are, however, influences over which the planter has no control, that materially affect the growth of the plants.

These are—(1) the rainfall, (2) the temperature, (3) sunshine, and (4) the wind. The cotton plant is of delicate constitution, and the climatic conditions have a very great influence upon its successful growth. No crop develops better under, and responds more favourably to, suitable conditions than does the cotton crop, but should the conditions be unfavourable, it would be difficult to imagine a field of plants more uninviting in appearance.

As regards the rainfall, the quantity required varies with the age of the plant. During the first three or four months, moderate and well distributed showers are most satisfactory; but near the period when the bolls commence to ripen, very gentle showers are all that is required.

Too little rain is always more acceptable to the cotton plant than too much. If very heavy rains fall during the early period of the growth of the plant, the main stem becomes tall and slender, and the ground not being in a condition



for weeding operations to be carried on, the weeds soon get far ahead. When heavy rains fall during the latter period of the plants' growth, they retard the ripening of the more mature bolls and cotton, and the younger bolls which are only just forming are dropped to the ground.

Drought has also its effect on the plants. When there is too little moisture in the soil there is a scarcity in the amount of food elements supplied to the plant, and there is also a chance that more moisture may be given off by the leaves than enters the plant by the roots. The result of this is, that the plants remain small and stunted, and ripening is unduly hastened. But with just the amount required, the plants grow to a medium height, and produce stout main stems from which arise good, healthy, boll-bearing branches.

Sudden changes in the weather have a very serious effect on the cotton plants. If they occur at the time when the bolls are just forming, the plants which may have been promising a good crop have their fortunes turned, and most of the bolls may fall to the ground.

Then again, the cotton plant delights in an abundance of sunshine, and in this part of the world, its requirements in this direction are usually well supplied.

The effect of wind on the cotton plant is very marked. In any locality where strong breezes prevail, or when there is an unusual spell of high winds, the plants lose their soft, green, healthy character and develop a hardness which is indicative of unfavourable conditions; they may also lose many of their bolls and be more or less stunted. The ideal climatic condition for the successful growth of the cotton plant can be summarized thus :—

A moderate rainfall, well distributed, during the first four months, followed by light showers during the ripening period.

An abundance of sunshine.

A calm, gentle breeze.

Although the planter has no control over the rainfall and the wind, yet it is possible for him to arrange to plant his cotton at the time of the year when he will be likely to have the rainfall most suited to the requirements of the crop, and in positions where it will be more or less sheltered from the wind.

### SEA ISLAND COTTON.

The extracts from Mr. Gordon's paper on Sea Island cotton, commenced in the *Agricultural News* of August 24, are continued below, and in this issue is given a description of the method of cultivation adopted by the planters of Georgia, Florida, and S. Carolina :—

About the first of January, or as soon after as the growth of the previous year is brittle enough to cut, all of the stalks are cut down with roller cutters, and ploughed under with heavy two-horse ploughs. The stalks are left to rot until about planting time, which is usually during the latter part of March or the first half of April. The land is run off into rows,  $4\frac{1}{2}$  to 5 feet apart, and the ground is bedded. These beds are then opened, and the ground manured, at the rate of 300 to 600 lb. of mixed fertilizers per acre, this being strewn in the rows. The seed is planted immediately afterwards and is covered with about 2 inches of soil.

In about three weeks, when the cotton is all up, the hoe hands are put into the fields and they chop out the rows, leaving one or two stalks to the hills. The best planters leave

a distance of from 12 to 18 inches between the hills. Throughout the spring and summer, and until about the middle of July, the crop is ploughed once or twice a month, or oftener, according to the amount of rain, in order to loosen the ground and keep the grass and weeds down.

Early in June the plants begin blooming, the flowers being a pale yellow in the morning, and fading to red in the afternoon. There are three sets of bolls on each stock, which constitute respectively, the first or bottom crop, the second or middle crop, and the third or top crop. The staple produced from the three pickings varies greatly, the staple of the top crop being usually much inferior to that of the other crops.

The blossoms stay on the plants from twenty-four to forty-eight hours and then drop off, leaving the 'form' or 'square,' which develops into the boll. The first bolls begin to mature about the end of August or first part of September, the three months from June to September inclusive being considered the most important in the cultivation of Sea Island cotton. Blooms that come after September 10 are not expected to mature, as the bolls will probably be caught by the frost.

Rains are particularly damaging to Sea Island cotton, as they cause the stalk to grow too rapidly, and thus shed its leaves and bolls.

Statistics of the rainfall show that it is greatest when the plants are growing, viz., from May to August; while when the crop is maturing and being picked, from September to November, the rainfall is least.

With the opening of the first bolls, picking commences, and continues well on into December, according to the size of the crop and the lateness of the season. The cost of picking, ginning, and preparing for market, is about twice that of the ordinary Upland cotton, and it has been demonstrated by experience that whenever the market price of Sea Island falls to a figure less than double that of Upland cotton, farmers will plant the latter in place of Sea Island cotton, the lands being equally well adapted to either growth.

The cotton is ginned on a roller gin, and should be carefully prepared while in the seed before ginning. On the islands, women are employed to pick the seed-cotton, and stress is laid upon the importance of gathering it free from stains, leaf, and immature locks. It is important also that the cotton be free from dampness when ginned, as otherwise the staple will be crimped and materially injured. On the other hand, it should not be dried to such an extent that the essential oil from the seed will be extracted from the staple, leaving the latter brittle and undesirable.

The gins almost universally used are the Macarthy Single Action, Single Roller Gins, made by Messrs. Platt Brothers, of Lancashire, England. There are, however, many modifications.

The yield and cost of production, the price of picking and the price of ginning vary so widely in different localities that no general statement of these can be given. In some places, the cotton is bought in the seed, and ginned at large ginneries; in others it is first ginned, and the seed and lint are then bought at specified prices. In certain sections, small gins are scattered throughout the country. At these the farmers have their cotton ginned, and then bring it to market on wagons in order to sell it in the bale.

The seed is used in some of the local oil mills, but a large percentage of it is exported, and is crushed abroad in connexion with Egyptian seed.

(To be continued.)



## EDITORIAL NOTICES.

Letters and matter for publication, as well as all specimens for naming, should be addressed to the Commissioner, Imperial Department of Agriculture, Barbados.

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# Agricultural News

VOL. VI. SATURDAY, SEPTEMBER 21, 1907. No. 141.

## NOTES AND COMMENTS.

### Contents of Present Issue.

The editorial, which should be of especial interest to those planters who have taken up the cultivation of Sea Island cotton, gives particulars of the best methods for keeping in check the insect pests of the cotton plant.

A brief article in review of the manurial experiments with the sugar-cane that have been carried on in the Leeward Islands for the past six years, will be found on p. 291, together with notes on the sugar industry in Jamaica, Demerara, and Formosa.

A report on the experimental work in connection with the cultivation of date palms and different varieties of mango, carried on at the Royal Botanic Gardens, Trinidad, appears on the West Indian Fruit page. The present condition of the banana industry in the Canary Islands is also described.

The articles appearing on the cotton pages include Seasonable Notes, and a continuation of Mr. Gordon's paper on 'Sea Island Cotton,' etc.

The cockroaches of the West Indies are described under 'Insect Notes' (p. 198).

A résumé of an interesting lecture by Mr. Herbert Wright, F.L.S., on the subject of shade trees for cacao, is given on p. 299., and on p. 301 will be found an article dealing with 'thread blight,' a fungus disease affecting cacao and other trees.

Rubber production and consumption are discussed on p. 302.

### Paris Green and Cotton Plants.

In connexion with the use of Paris green as an insecticide against the various cotton pests, Officers of the Imperial Department of Agriculture are holding meetings on various estates in Barbados with a view to demonstrating the best methods of application of the powder, what amount should be used, and what apparatus should be employed.

Such a meeting was held at Congo Road estate, St. Philip's parish, on September 12, and was attended by about 150 estate owners, managers and small cultivators, all of whom were interested in the demonstrations given. The mixture of 1 part of Paris green with 6 parts of lime was applied by means of the tickling-burg bag, the tin shaker, the Acme powder bellows, and the Champion powder gun.

The extreme wastefulness of the use of old oat sacks was also shown. Discussion followed, and a free exchange of ideas took place. Many who were present were convinced that they had used in the past much more Paris green than was necessary. It was stated by successful cotton planters that when Paris green was used in the way shown,  $\frac{1}{2}$  lb. would be sufficient for one application to an acre of young cotton, while from 1 lb. to  $1\frac{1}{2}$  lb. would serve the purpose if the plants were nearly full-grown.

It would seem that meetings of this kind should prove of considerable value to cotton growers.

A similar meeting was held at Husband's plantation, St. Lucy, on September 19, and was attended by practically all the planters in the neighbourhood.

### Importance of Pure Milk.

A correspondent writes to the *Port-of-Spain Gazette* to complain of the unsatisfactory conditions under which a great part of the milk supply of Trinidad is produced. One of the dairy Ordinances in force in England, provides that milking cows must be kept in sheds quite separate from dwelling houses, and that immediate notice must be given to the authorities of any disease existing in the family of the occupier of the premises nearest the dairy. This is quoted by the correspondent, who then refers to the different conditions prevailing among the large numbers of East Indian milk producers in Trinidad, who, it is said, practically live in the same building with their cattle.

Milk is a substance which readily absorbs taints and bad odours from the atmosphere; it runs every risk of being contaminated with impurities from the body of the cow, the hands and clothes of the milker, and from the water used in washing the utensils. Further, on account of its nutritive properties and suitable temperature, it is peculiarly adapted to serve as a breeding ground for disease germs, and for their conveyance into the human system.

From these considerations it is obvious that too much care cannot be taken to ensure the provision of a pure milk supply, and this is more especially important in the case of young children and invalids.



## Sugar in Great Britain.

Volume VII of the report of the Tariff Commission in England, which was recently issued, deals with the sugar and confectionery trades, and contains a good deal of information as to the amount of sugar consumed in England, the sugar refining industry, imports and exports, etc.

The particulars given bear witness to the enormous increase in the annual consumption of sugar in the United Kingdom. Fifty years ago it was  $29\frac{1}{2}$  lb. per head of the population; in 1903 it had advanced to  $79\frac{1}{2}$  lb. per head, while in 1906 it had again increased to  $95\frac{1}{4}$  lb. These figures make the decline of the sugar refining industry of England the more apparent. In 1885, the sugar refined in British factories exceeded  $19\frac{1}{2}$  million cwt.; in 1903 it had fallen to  $12\frac{1}{2}$  million cwt., although in 1906 it was  $15\frac{1}{4}$  million cwt.

Fifty years ago practically the whole of the sugar consumed in the United Kingdom was refined in home factories; twenty years ago 70 per cent. was refined in Great Britain; in 1906 only 45 per cent. of the sugar consumption was British refined, the balance being made up by sugar refined in continental factories. The British importation of refined sugar from Germany is now  $12\frac{1}{2}$  million cwt., an increase of  $10\frac{1}{2}$  million cwt. in twenty years.

## Conditions in the Danish West Indies.

The low economic and financial condition of the Danish West Indies was the subject of a lecture delivered in Copenhagen some months ago and recently reprinted in the *St. Croix Avis*.

The depressed condition of affairs was attributed to increased expenses of administration subsequent to the emancipation of the slaves, the constant fall in the price of cane sugar, which has reduced the value of estates and caused large areas of land to go out of cultivation. Owing to the fact, too, that beet sugar is largely produced in Denmark, the Danish West Indies have to look for a cane-sugar market in the United States, where, however, their product has to pay duty, and cannot compete on equal terms with the sugar from the Southern States, Cuba, and Porto Rico.

The poverty of these islands is still further increased by very high taxation, the import duties on the first necessities of life for the poorer classes, such as flour and pork, being about 24 and 36 per cent. of their value.

At present the brightest prospects from the agricultural point of view appear to be those attendant upon the cultivation of Sea Island cotton, an industry which (as mentioned in another part of this issue) has recently been taken up, and is undergoing extensive development.

The supply of labour in St. Croix is reported as being very deficient, owing to the dissatisfaction of the negroes with their prospects, and increasing emigration to the United States on their part.

The lecturer urged the necessity of providing the negroes with plots of land, as the best way of restoring

a measure of agricultural prosperity to the islands.

He quoted the example of Jamaica, where, in 1895, there were upwards of 72,000 properties below 5 acres in size, exclusively owned by blacks, and he pointed out that the increasing fruit exports of this English colony were largely owing to these small proprietors.

## Conditions of Vegetable Growth.

The last *Annual Report* of the Director of the Royal Botanic Gardens, Peradeniya, Ceylon, contains particulars of observations upon the rate of plant growth and the conditions upon which it depends, which have been carried out for some time past by Mr. A. M. Smith, the Scientific Assistant at the Botanic Gardens. Food, temperature, and moisture constitute the factors upon which growth depends, and Mr. Smith's work confirms the theory advanced by Mr. E. F. Blackman, F. R. S., of Cambridge, that the rate of growth at any one time is determined solely by the factor present in poorest supply, be it food, temperature, or humidity. In other words, only one factor limits growth in the plant at one time. Given that the temperature is low, no amount of food or dampness will produce rapid growth; while if food is insufficient, no amount of temperature or humidity will do so. This work constitutes an interesting and important advance in vegetable physiology, and looking at it from the practical agricultural point of view, it furnishes an explanation of the fact that recommendations made for one country need not necessarily be of any use in another.

## Proposed Rubber Exhibition in London.

An article by Dr. Olsson-Seffer, originally appearing in the *Mexican Investor*, and reprinted in the July issue of *Tropical Life*, brings forward the question of an annual international rubber exhibition for the purpose of making the general public acquainted with the progress of rubber cultivation and manufacture, together with a Rubber Congress for discussing matters of interest to planters, manufacturers, and investors, the first meeting of which it is proposed to hold in London next year. Such gatherings would no doubt have a good influence towards the development of rubber cultivation and production, and the proposal appears to be well received both in England and abroad among those interested in the rubber industry. Manufacturers of rubber machinery who have been approached have promised their assistance, and the various Governments of countries in which rubber is grown are willing to co-operate. Once a successful exhibition has been held in London, it is hoped that others will follow at regular intervals.

Professor Wyndham Dunstan, F.R.S., of the Imperial Institute, has promised to approach the British Government on the subject, and from the interest and activity at present displayed, the idea should be brought to a successful issue.





## INSECT NOTES.

### Cockroaches.

In recent numbers of the *Agricultural News*, short articles have appeared dealing with four families of the 'Orthoptera.' The first of these, which was entitled 'Crickets' (Vol. VI, p. 106), gave a brief account of the family 'Gryllidae'; the second, entitled 'Grasshoppers' (p. 218) dealt with the families 'Locustidae' the grasshoppers, and 'Acrididae' the locusts.

On page 234, an article entitled the 'Guava Lobster' gave an account of the family 'Phasmidae,' which includes the stick-insects and the leaf-insects.

Cockroaches belong to the same natural order as the crickets, locusts, grasshoppers, stick-insects, and leaf-insects, and are included in the family 'Blattidae.' Every resident in the tropics is probably familiar with the appearance of at least one kind of cockroach, but few realize how many different kinds there are.

The commonest cockroaches in the West Indies are the two related forms, *Periplaneta americana*, and *Periplaneta australasiae*. The former of these is the larger and more abundant. The insects of both species are brown in colour, with slender antennae which are considerably longer than the body, and long spiny legs. The larger individuals of *P. americana* frequently attain a length of body of 2 inches; *P. australasiae* is about  $1\frac{1}{8}$  inches in length. The latter is further distinguished by the light and dark markings on the thoracic shield, which, in *P. americana*, are not well defined, while in *P. australasiae*, the dark, central portion is sharply set off by the much lighter area surrounding it.

These are the common cockroaches found in houses and on ship-board. The young are smaller than the adults, and are without wings. The adults may frequently be seen flying about on the warm, damp nights of the rainy season.

In addition to their offensive odour, which of itself makes these insects very objectionable, their feeding habits make them decided pests. All kinds of sweet and farinaceous foods are attacked by them and they frequently ruin starched articles of clothing, such as collars and cuffs.

These cockroaches are not difficult to control in houses. Boracic acid is poisonous to them, and any attractive food material mixed with it may be used as a bait. A good mixture is made of equal parts of boracic acid and molasses, or sweet chocolate. If this is placed about in the haunts of the cockroaches, it will be eaten and the insects will be killed.

Ordinary borax, such as is used for washing, if scattered about in places infested with these pests, will drive them out. Naphthalene is also useful in this way. The bindings of books are often utterly destroyed by cockroaches, and when not destroyed are frequently mutilated. This can be prevented by the use of the book solution recommended in the *Agricultural News* (Vol. I, p. 140).

Another cockroach, a large grey insect (*Leucophaea maderae*) is to be found in out-buildings, about cane trash

heaps, in the cane fields, and similar locations. This is a larger insect than *P. americana*, being slightly longer, and much broader, but the antennae are much shorter. It is readily distinguished by its grey colour and broader proportions. There are several other household cockroaches, all of a comparatively small size, which are found in the West Indies, and all of which may be controlled by the measures indicated above.

The eggs of cockroaches are laid in egg cases, each case or capsule containing a considerable number of eggs. They are frequently parasitized by a small hymenopterous insect which destroys the eggs.

If the egg capsules are collected and kept in a glass covered with muslin, young cockroaches will be seen emerging from some of them by the natural opening along the edge of the capsules, while, the minute dark-coloured fly-like parasites may also be seen emerging from a small round hole in the side of other capsules. Cockroaches are also preyed upon by centipedes, or 'forty-legs.'

### THE CALABASH TOBACCO PIPE.

As will be seen from the following extract from the *Kew Bulletin*, No. 7, 1907, it is now practically certain that the calabash pipe (*Agricultural News*, Vol. V, p. 399, and VI, pp. 123 and 269), is made from the fruit of the 'bottle gourd,' a well-known cucurbitaceous plant (*Lagenaria vulgaris*), which is found in all tropical countries, and is recorded by Grisebach as occurring in Jamaica and Antigua:—

The identification of the plant furnishing the fruit from which the calabash tobacco pipes are manufactured is not quite clear, but they are certainly not made from the common calabash (*Crescentia Cujete*), a tree of the West Indies and South America. Judging, however, from an illustration and from some seeds kindly forwarded by Professor Pearson, it appears almost certain that they are made from the fruits of one of the forms of the bottle gourd (*Lagenaria vulgaris*), which is employed in various parts of the world for a great variety of purposes.

The following note appeared in *Industries of Cape Colony*, compiled by the Department of Agriculture, 1907, p. 69:—

The making of calabash pipes is entirely a South African industry which has only grown to considerable proportions within the last couple of years or so. The calabash is grown in certain districts in the south of Cape Colony, and in every town of importance there are several factories. The pipe has become a favourite with tobacco smokers for various reasons, and appears to have won the place in public estimation for years held by the meerschaum. The price of the article varies, according as it is mounted in gold, silver, or base metal, and whether the mouth-piece is either vulcanite or amber. Employment is afforded to a fair number of pipe makers. The calabash pipe has not yet appeared as an article of export from South Africa, but still a great many are bought by tourists and other visitors, while residents send them as presents to their friends. The calabash pipe gives every promise of becoming as fashionable with smokers in South Africa as the corn cob is in America, with the additional recommendation that the calabash is a pipe that lasts, and one which smokers take as much delight in colouring as used to be the case with the meerschaum.



### SHADE TREES FOR CACAO.

The question of shade for young cacao trees, and the best means of providing it, formed the subject of a lecture recently given by Mr. Herbert Wright, F.L.S., (formerly Controller of the Government Experiment Station, Peradeniya, Ceylon) in the Chamber of Commerce, Liverpool.

At the commencement of the lecture the conditions of cultivation of cacao trees were described, and it was pointed out that as these trees were small, were planted a fair distance apart, and no crop was obtained till the plants were some years old, the matter of the planting of shade trees became one of importance both from the commercial and the scientific point of view. By this means the soil was preserved against exposure, and, if suitable trees were used, the ground might be made to yield two crops instead of one, while the fall of leaves acted as a manure to the soil.

In America, as well as in the West and East Indies, the most thriving cacao plantations—especially in their younger stages—were to be found growing under shade, and exhaustion both of the soil and of the cacao plant occurred much more quickly when not grown in association with those protecting trees.

From his experience in Ceylon, Mr. Wright stated that he should recommend that where trees of the legume type, such as *Erythrina* and *Albizia* were selected for shade purposes, they should be pruned so as to afford maximum protection against the sun in dry months, and the minimum in dull, wet weather. Young plantations of cacao may be shaded with species of banana, or castor oil plants, and so on, but these should be regarded as temporary and allowed to die down after a couple of years.

The effect of strong winds on the foliage of the cacao trees was described as causing the leaves to become brittle and dry, and ultimately more or less completely to defoliate the cacao trees, and the necessity, in districts subject to winds, of protective belts of trees, was emphasized. The results of observations in West Africa were brought forward by Mr. Wright as an illustration of the beneficial effects of shelter belts. In 1903, a sheltered part of the plantation yielded 2,463 fruits per acre as against 1,275 fruits per acre obtained in the unsheltered part; in 1904, the crop yielded by the sheltered plantation was 5,268 fruits per acre, as against 2,942 per acre on the unsheltered part, while in 1905, the figures were 6,430 fruits on the sheltered and only 4,024 on the unsheltered plantation.

Speaking more especially with reference to West Africa, the lecturer advised that in several cases the most profitable course to pursue would be to retain lines of wind belts of original forest between blocks of cacao, and to interplant the young cacao with rubber-producing trees, preferably species of Para or Castilloa. On many estates in Ceylon, it was stated, cacao and Para rubber trees exist at the rate of 100 of each per acre, and give very satisfactory results. The cacao comes into bearing in the fourth year and the Para rubber trees in the fifth or sixth year. There are some estates where the cacao has been interplanted with Para rubber trees, the latter being now eight to eleven years old; these properties are giving about 200 lb. of rubber and the same weight of cacao per acre per year. Mr. Wright then referred to conditions in the West Indies, where Castilloa rubber trees are being successfully grown in association with young cacao. He would not however recommend Castilloa, and certainly not the Ceara rubber tree (on account of the exceptional length of the leafless period of the latter), in preference to Hevea in West Africa, but thought the indigenous Funtumia trees might be more largely tried. On account of the erect nature and short

branches of the Funtumia, the trees could be planted closer than those of other species.

Assuming that fair yields may be obtained from both kinds of trees, Mr. Wright estimated the value of the rubber produce at £50 per acre, and that of cacao at £8 to £12 per acre, so that the rubber may easily become the more important item. The presence of the rubber trees also reduces the cost of upkeep as the growth of weeds is kept in check by the shade.

### VANILLA GROWING AND CURING IN THE WEST INDIES.

Efforts have frequently been made in the past to encourage the growing of vanilla in various parts of the British West Indies, and to instruct growers in the best methods of curing the beans, with the object of creating a minor industry in this direction.

Samples of pods produced and cured in Dominica some years ago were very favourably reported upon at the time, by experts in London. (*Agricultural News*, Vol. II, p. 199.) In British Guiana, too, it is reported that the vanilla plant grows wild throughout the country, and its systematic cultivation should undoubtedly prove a valuable supplementary industry to the smaller agriculturists. In 1902, the Governor of British Guiana offered a prize of \$50 for the best sample of vanilla (not less than 10 lb.) grown in the colony, with the object of stimulating its production, but the matter appears to have ended there. A plot of vanilla was also formed at the Botanic Station, St. Vincent, in 1905 (*Agricultural News*, Vol. V, p. 348), and the plant gave every indication of doing well in the island, though it is at present grown only on one estate. Vanilla is a crop especially suitable for small cultivators, as little capital is required in its production, and its growth does not demand much attention; but care and skill are requisite in curing the beans.

The August number of the *Journal* of the Jamaica Agricultural Society reports that vanilla is grown by small settlers in Northern St. Elizabeth and Westmoreland, and the plant appears to find these districts well suited to it, and is in a very flourishing condition. The *Journal* publishes the following particulars (furnished by a correspondent) as to an approved method of curing the beans:—

When the ripe beans are brought in, dip them in boiling water and keep them immersed about forty seconds. Then drain and wrap them in a blanket, and put them away in a box or drawer. Next day spread them out in the sun in the blanket, but take them in while the sun is still warm and the beans are hot, wrapping them again in the blanket and putting away. This process should be continued until the beans are wrinkled and of a good colour. It takes some knowledge to know when the beans are at their best when curing. It is an easy mistake, though a bad one, to over-cure them. The beans must not be hard and dry, but pliable. Each bean should be smoothed carefully between the fingers. No oil should be used to the beans on any account; they have enough of their own essential oil.

The dried beans must then be sorted out according to their length, the long tied ones being the most valuable. Beans of the same length should be tied in bundles of twenty-five or fifty, the string or tape being tied close to the end of wet bundles. The bundles can then be packed in closely fitting tin boxes, which must be put in wooden boxes for shipment abroad. Biscuit tins may be used, but clean kerosene-oil tins, soldered up to exclude air and moisture, are more convenient, as they can then be packed in their own boxes just as honey is shipped.





## GLEANINGS.

Last year the imports of bananas into the United States reached the value of \$6,662,254.

During the year ending June 30, 1906, Canada imported sugar and molasses of a value of £1,406,733 from the British West Indies.

The exports of rum from Jamaica during the year 1905-6 show a decrease in quantity of 103,808 gallons, but—owing to the higher prices obtained—an increase in value of £6,347, as compared with the exports of the previous year.

Last year's report on Jamaica states that the production of bananas by small cultivators in the north-western part of the island shows a continuous and steady increase.

The world's consumption of cacao has advanced from 269,000,000 lb. in 1902 to 342,000,000 lb. in 1906—an increase of 27 per cent.

In 1906 there were exported from St. Croix 48,269 gallons of rum, of which 39,764 gallons went to Denmark. Jamaica rum also has a market in Denmark.

As many as 17,811 plants were distributed from the Botanic Station, Tobago, last year. Of these no less than 12,854 were cacao seedlings. The demand for plants of various kinds exceeded that of any previous year. (*Annual Report.*)

The amount of sulphate of ammonia produced in England during the year 1906 was 289,391 tons, an increase of 20,000 tons over the figure for the previous year. Nitrate of soda was imported to the extent of 108,486 tons during 1906, this amount being 4,000 tons in excess of the imports for 1905.

The last year's report on the Onderneeming Farm School, British Guiana, shows that while the area under coffee cultivation remained the same, a yield of 3,250 lb. of cured coffee was obtained as against 2,485 lb. and 1,808 lb. respectively, in the two previous years. It is expected that next year's crop will reach 4,000 lb.

A return has been published which shows that from August last year to January this year, the British West Indian Fruit Company, Ltd., purchased in Trinidad and shipped to England, bananas and oranges to the value of \$3,772.50, and from January to July this year they paid \$7,476.77. These sums include the cost of labour for packing the fruit. (*Port-of-Spain-Gazette.*)

At a recent meeting of the British Guiana Board of Agriculture the prospects of the lime-growing industry in the colony were referred to by the Governor as being very promising. Professor Harrison mentioned that the company who were looking after the industry had a capital of £50,000, and intended to go in not only for lime growing, but for the production of minor agricultural crops generally. There was no doubt that the company would be able to take all the limes the colony could produce.

In answer to a correspondent who inquires as to the best rotation of crops for tobacco land, a writer in the July number of the *Tropical Agriculturist* recommends—(1) tobacco, (2) a leguminous crop, e.g., Bengal bean (*Mucuna pruriens*, var.), Louisiana cow pea (*Vigna Catjang*), woolly pyrol (*Phaseolus Mungo*), etc., the plants of which should be dug into the soil after the crop has been taken in; and (3) a grain crop, such as rice, various species of sorghum or maize.

The *Cuba Review* states that the raising of hogs is a most profitable industry among the smaller agriculturists of Cuba. Little capital is required; there are few diseases, and in many cases the animals run half-wild, living to a considerable extent on the nuts of the royal palm, which are very fattening. They are however also fed with cassava, sorghum, and sugar-cane. There are many native varieties of hog in Cuba, the best being the Chinese. American breeds (excepting the whites) do well in the island.

The *West India Committee Circular* mentions that efforts are on foot to make experimental exports of citrus fruits from Sydney to England, and a shipment of 4,500 cases, to be sent off on June 24 last, was discussed at a meeting of growers. The freight charge was to be 3s. 1d. per case of 150 oranges, and the cost of the case, 9d. For good results the temperature of the storage chambers will probably have to be kept at from 40° to 50 F.° Should the preliminary shipments turn out well, great possibilities of trade will be open to the Australian fruit grower.

A correspondent of the *Port-of-Spain Gazette*, referring to the use of kerosene oil in the destruction of mosquitos, points out that the best method for the ordinary householder to adopt is to place a vessel of water, with the usual thin layer of kerosene oil on top, in a conspicuous position, where the insects cannot fail to see it. The mosquito goes there to lay its eggs, but is caught in the film of oil, and so is got rid of, together with her progeny. Experience has shown that large numbers of the pests are soon destroyed in this way.

'On a Yacht from Trinidad to Jamaica' is the title of an article appearing in the August number of the *Empire Review*. The writer, Mrs. Trench Gascoigne, describes in a very interesting way her impressions of the islands of Tobago, Grenada, St. Vincent, St. Lucia, Martinique, Dominica, Guadeloupe, Montserrat, Antigua, St. Kitt's, as well as the Danish West Indies, Porto Rico and San Domingo, all of which she visited. Mrs. Gascoigne affirms that she was much struck by the more prominent evidences of prosperity and well-being apparent in the French islands of Martinique and Guadeloupe as compared with the British West India Islands.



## THREAD BLIGHTS.

Previous mention of thread disease of cacao has been made in the *Agricultural News* (Vol. III, p. 281, and Vol. IV, p. 117), and reference was made to a similar disease of tea reported in Ceylon, in the *Agricultural News*, Vol. V, p. 362.

The following brief memorandum by Mr. F. A. Stockdale, B.A., Mycologist on the staff of the Imperial Department of Agriculture, dealing with the fungus disease of plants popularly known as thread blights has been published, together with the letter of transmittal from the Imperial Commissioner of Agriculture, as Society Paper No. 250, in the *Proceedings* of the Agricultural Society of Trinidad and Tobago:—

Thread fungi generally consist of sterile mycelial threads, or strands of various colours running irregularly up and down on branches and stems, and closely depressed to the bark. The delicate strands of mycelium sometimes form swellings before branching takes place, and generally spread upwards over all the younger twigs and buds and then they not infrequently pass to the leaves and appear on their under surfaces in the form of a network of fine filaments. Where two leaves touch, these filaments spread from one to the other, sometimes forming a thickened cushion at the point of contact.

Microscopic examination of the strands shows that they are composed of parallel-running fungal hyphae closely woven together. From the under side of these strands, numerous hyphae are given off into the bark of the twigs, and in the case of young twigs these hyphae penetrate into the living cortex and sometimes into the deeper tissues—thus causing the death of the attacked portions. Similar hyphae also penetrate into the interior of the affected leaves and into the tissues of buds, and therefore leaves and buds may be killed out by the fungus.

Specimens received lately from Trinidad and which have been examined at this Office show that the mycelial threads on each are not composed of similar hyphae, and therefore it is extremely probable that the threads on the twigs, etc., do not represent the same fungus in all cases. As it is only in a very few species of fungi that identification can be made from mycelium alone, definite identification of the specimens examined cannot be made until fructifications have been found. It is however probable that most of the thread fungi belong to the Basidiomycetes, for, with but one exception, the mycelium in the specimens forwarded by Mr. Hart from Trinidad, exhibited the 'clamp-connexions' of Hoffman, characteristic of this group.

*Distribution.*—Thread blight has been known for many years upon tea in India, and until recently was usually neglected, as it was thought to be doing little or no harm. In 1903, thread blight was reported as being one of the most common and, perhaps, one of the most destructive blights of the tea plant, and every effort was being made to eradicate it. In Ceylon, it has been known to occur upon nutmeg trees as well as upon tea.

In 1904, specimens of thread blight were forwarded to this Office from St. Lucia, and later in the same year, it was reported from an estate in Trinidad. Since then, this disease of cacao has been discovered on a neglected estate in Demerara, and specimens of thread fungi attacking forest trees and shrubs have been received from Dominica and Tobago.

*Spread.*—In India the 'thread blight' is known to occur on wild trees and to spread from these to the tea bushes. Probably the same may happen in the case of cacao. The chief method of spread is by means of the threads on dead twigs, leaves, etc., being blown or caught in the branches of healthy trees, while in India, cases are on record in which roots of a plant have been attacked by blight spreading from buried prunings. Although it would appear that where the threads are restricted to the stems of plants, the effect, as far as is known, is negligible; yet young twigs, buds and leaves can be destroyed by an attack. It is therefore of the utmost importance that all thread fungi should be carefully looked for, and when found on cacao, remedial measures promptly applied.

*Remedial Measures.*—1. Thorough and constant pruning and burning of all diseased material appear to have kept the disease in check in St. Lucia.

2. Application of a lime-sulphur wash (*West Indian Bulletin*, Vol. VI, p. 89) to the fungal threads . . . . . the mixture being rubbed into the threads . . . has given very satisfactory results in the treatment of affected tea bushes in India and is now in general use.

3. Prune back all wild trees, etc. that are affected with thread fungi in the neighbourhood of cacao estates, so as to be sure that the danger of spread from wild trees to cacao is minimized, for it is more than probable that thread fungi are not particular in their choice of host plants.

In conclusion it must be pointed out that thread fungi may cause considerable loss when they attack young twigs, leaves, etc., and when once established would be difficult to deal with.

## REPORT FROM ESSEQUEBO.

The particulars given below are extracted from the *Report*, for 1906-7, of the Commissioner for the Essequibo and Pomeroon Rivers District of British Guiana:—

The cultivation of rice is extending on the lower part of the Essequibo, and on the Aroabisci coast, but a considerable portion of the crop is lost at reaping time owing to the want of labour to gather it in. I have known men and their families camp in their rice beds and work late and early, even at night when there was sufficient moonlight, and yet lose part of their crops for lack of the assistance they were willing to pay for.

The farmers on the Pomeroon river have suffered much from the high winds and abnormal rainfall; their cultivation has been sodden and in some parts inundated. The Indian cassava cultivation too has suffered some extent.

The Rancheros of Brazilian nationality, who were resident on what is now the British side of the Takutu (the river forming part of the boundary between this colony and Brazil) have taken up from the Government concessions for grazing cattle under the existing Crown Lands Regulations. Farine, yams, cassava, and beef are the principal articles of diet of these people. They also make cheese both for home use and the market, an example that I think might be profitably imitated on the cattle farms on the coast of the colony.

Rubber and rubber cultivation have latterly excited considerable attention, and several kinds of rubber-producing trees are to be found in different parts of Essequibo county, more or less prolific in their yield of gum, and concessions have been taken out with the object of gathering it.



## RUBBER PRODUCTION AND CONSUMPTION.

An article in the August number of the *Mexican Investor* discusses the outlook upon the rubber industry, the relative supply of wild and plantation rubber respectively, the rate of consumption of the product, and the prospects of investments in rubber planting.

In connexion with the supplies at present put on the market, the enormous preponderance of the wild over the plantation product is at once apparent. As regards the quarters from which the rubber comes, statistics show that tropical America contributes about 63 per cent. of the world's total, tropical Africa 34 per cent., and Asia only 3 per cent.

To quote from the *Investor*:—

The principal source of supply is, of course, Brazil. It is calculated that of the total amount produced in 1906, at least 38,000 tons have come from the vast rubber forests of the Amazon basin. The keen demand which has existed of late years, however, has led to such severe tapping of the trees in all the more easily reached districts that it is now necessary to penetrate deeper and deeper into the interior in order to obtain fresh supplies of wild rubber, which of course means that the cost of collection is steadily mounting. In fact, so great are the difficulties to be overcome, that, allowing for export duty and other charges, it now costs about 3s. per lb. to bring this class of rubber to the market. It is evident that from this source, at any rate, there is no chance of any rapid increase in the supply. In fact, the high prices prevailing for the last ten years have been ample inducement for most strenuous efforts to increase collection, and everything possible to augment the output has been done. In the tropical forests both of Brazil and other parts of the world there are undoubtedly vast supplies of rubber, if it could be reached at a cost which would make collection profitable.

In connexion with the yield of plantation rubber so far available, figures are given which show that, last year the amount on the market from the Malay States and Ceylon, the chief sources of supply at present, was 510 tons, or no more than one-one hundred and thirtieth part of the world's total production.

The area devoted to rubber cultivation is being rapidly extended, and there will no doubt be a great increase in the output; but allowing for all possible speed, a considerable time (at least seven or eight years) must elapse before plantation supplies will become of sufficient importance to appreciably and permanently affect prices. The annually increasing demand too, will go a long way towards absorbing additional supplies.

The writer of the article in the *Investor* is certainly of opinion that over-production of rubber may fairly be regarded as a somewhat distant danger, and in conclusion he gives his reasons for anticipating that the price of rubber is likely to remain at its present figure for some time yet, and is unlikely to drop below 3s. or 4s. per lb. for many years to come. He points out that if the price of rubber fell to, say, 3s. per lb., a huge demand would spring up for it for such purposes as floor covering, and even wood paving. Further, at this low figure, it is questionable whether it would any longer pay to import Brazilian wild rubber at all, and the gap caused by the cutting off of the 38,000 tons now coming from the Amazon would have to be filled by the plantation product, which, as already mentioned, can be grown for about 1s. per lb., and would therefore still yield a handsome profit if sold at 3s. or 4s. per lb.

## TAPPING CASTILLOA TREES.

Mr. J. Herbert Foster, a planter in Mexico, has published the results of tapping *Castilloa* trees on his plantation at Tula de los Tuxtlas, of which the following summary appears in the July number of the *Tropical Agriculturist*:—

Mr. Foster shipped about 1,200 lb. of rubber from the Tula plantation in 1906. The trees averaged 20 to 25 inches in circumference just above the root enlargement, the largest one ranging from 30 to 38 inches. He uses a 'Smith' tapping knife, and makes three V-cuts about 20 inches apart, each reaching not quite round the tree, but leaving 5 inches uncut. A small cup is fixed at the apex of each cut, and the latex spooned down into it. The cups are emptied into a pail. There is no need of water to prevent coagulation. After tapping twelve trees, and again after two or three hours, the workman returns and spoons out the rubber in the cuts. At Tula the men tap all day, while in some parts of Mexico the heat checks the flow in the afternoon.

Each tapper has two 30-gallon barrels. The latex is washed through a fine sieve together with the washings of the cups, and the result of one day's work usually fills one barrel. The next morning the water is drawn off, as the creamy latex is on the top. The barrel is then half filled with fresh water, which is changed the same day. On the next morning all the water is drawn off, and the cream poured out on to frames to dry in the sun. The frames are made of 1 inch by 2 inch strips, 5 feet long and 10 inches broad, and divided by cross pieces into 8 inch squares. The bottom is made of cotton cloth. In ordinary weather, three to six days are required for drying. In 1905, the average price for Tula rubber and scrap was \$1 gold (4s. 2d.) per lb.

## KEEPING QUALITIES OF COCOA-NUT OIL.

A recently issued abstract of the American Chemical Society gives the result of observations showing that though ordinary commercial cocoa-nut oil deteriorates very rapidly, this being due to the presence of a considerable quantity (5 to 10 per cent.) of free acid, yet, under the right conditions, cocoa-nut oil may be prepared so that the amount of free acid present is very small, and such an oil will keep without deterioration for a much longer period than is usually thought possible, and even after standing for a year under ordinary conditions, may still be edible.

Increase in free acid, which constitutes deterioration, appears to be roughly proportional to initial acidity. Filtration, and the consequent removal of albuminoids, etc., was also found to improve the keeping qualities of the oil.

The greatest deterioration was found to take place in copra itself, which is attacked by moulds or bacteria with the production of free acid. Philippine copra contains 9 to 12 per cent. moisture, and in such a condition acid is readily produced. Drying to 5 per cent. moisture, it is stated, would obviate this condition.

Drying experiments go to show that some form of rotary dryer is best adapted for copra.

Experiments have been conducted at the Government Farm, San Ramon, Philippine Islands, as to the influence of age and storage of cocoa-nuts on yield of oil. Nuts dead-ripe from the trees gave the greatest amount of copra and oil, and storage up to three months increased the yield of both.



## WEST INDIAN PRODUCTS.

### Spices and Drugs in the London Market.

Little or no change has occurred in the tone of the produce markets generally since our June report, which indeed is the normal condition of things, as the holiday season advances. The only article of special comment among the drugs and spices of West Indian produce will be found in Jamaica ginger, the quotations of which, about the middle of the month, showed a considerable drop on previous rates. The details are as follows:—

#### GINGER.

At the first spice sale on July 3, there were no offerings of Jamaica ginger; 210 bags of Calicut were catalogued, but none were sold. A week later 140 packages of Jamaica were offered and all were bought in. Cochin and Calicut were dull of sale. On the 17th, there were no offerings of Jamaica. Of Cochin, 50 bags, washed, ordinary, dull, slightly wormy, fetched 35s. Ordinary small Calicut was bought in at 50s., while 15 bags small limed Japan realized 27s. per cwt. On the 24th, there was practically no demand for Jamaica, 22 packages only being sold out of a total of 250 offered, and these were disposed of at lower rates, ordinary realizing 69s. 6d., and good ordinary 74s. per cwt. On the 31st, Jamaica was not represented, but there was a big supply of 1,200 packages of Cochin and Calicut, about half of which were disposed of at lower rates.

#### MACE, NUTMEGS, AND PIMENTO.

With regard to mace, the market has ruled evenly throughout the month. At the spice sale on the 17th, 63 packages of West Indian were sold at the following rates: Good, 1s. 5d. to 1s. 6d.; fair, 1s. 3d. to 1s. 4d., and ordinary, 1s. 1d. to 1s. 2d. Since then, no change has taken place. Of nutmegs, at the first spice sale on July 3, sturdy rates were obtained for 260 packages out of 330 packages offered. On the 17th, 200 packages West Indian were offered and sold somewhat easier.

Pimento has preserved a firm but quiet tone throughout the month.

At the spice sale on the 10th, 20 bags were sold at 2¾d. per lb. for fair, and on the 17th, 200 bags were offered and bought in at 2¾d. to 2⅞d. per lb. With regard to arrowroot, no offerings were made during the month until the last day, namely, 31st, when 50 bags fair manufacturing St. Vincent were offered and bought in at 2¾d. per lb.

#### SARSAPARILLA.

Owing to plentiful supplies, a quiet and easier tone has prevailed. At the first drug sale on the 4th, 5 bales out of 33 of sound grey Jamaica, offered, sold at 2s. 1d. to 2s. 4d. per lb. A large quantity of native Jamaica was offered, and 2 packages were disposed of at 1s. 2d. for fair red, good being bought in at 1s. 4d. to 1s. 5d.; 1s. 8d. to 1s. 9d. was paid for 5 bales very rough Ima-Jamaica, while for 6 bales very common and rough, 1s. 6d. was accepted. At the auction on the 18th, the prices stood thus: 22 bales of grey Jamaica, fair fibrous, part rough, realized 1s. 8d., while for fair, part coarse and sea-damaged, 1s. 6d. to 1s. 7d. was paid, but 1 bale fetched as much as 1s. 8d. Of native Jamaica, mixed pale yellow and reddish sold at 1s. to 1s. 1d., and low greyish at 11d.; good red was bought in at 1s. 2d. The prices generally ranged from 3d. to 6d. and 8d. per lb. cheaper than previous rates.

#### KOLA, TAMARINDS, LIME JUICE, AND QUILLAJA BARK.

At the auction on the 17th, 4 packages of kola nuts were offered, and for a bag of fair small Jamaica 3d. per lb. was obtained; another bag, somewhat mouldy, fetched 2¾d., and a box of fresh, 2½d. per lb. At the same time 30 barrels out of 46 offered, of dryish broken Antigua tamarinds, sold at 14s. 6d. per cwt., in bond.

At the beginning of the month there were small sales made in fair raw West Indian lime juice at 1s. 4d. per gallon. A week later 1s. 4d. to 1s. 6d. was asked according to quality. On the 31st, 2 cases and 1 box of West Indian distilled Oil of Bay fetched 7s. per lb., and 2 cases of West Indian butter orange oil sold at 6s. per lb.

Quillaja bark, of which a quantity was reported to be lying at Liverpool at the end of July, was quoted at £26 per ton.

### BARBADOS AGRICULTURAL EXHIBITION.

By kind permission of Mr. G. C. Edgehill, arrangements have been made for the next Barbados Agricultural Exhibition—the eighth of its series held under the auspices of the Imperial Department of Agriculture—to take place at Applewhaites plantation, in the parish of St. Thomas.

As pointed out by Sir Daniel Morris in his address at last year's exhibition, held at Maynard's plantation, St. Peter, these annual shows were started with the object of encouraging small holders to make the best use of their land, and to assist them in the selection and production of those crops likely to prove of most value to them. A further object was to increase the welfare of the smaller agriculturists by encouraging the production of poultry, pigs, and sheep, and with proper attention, there is no doubt that poultry raising might be made a much more profitable industry in the island than at present seems to be the case.

The *Barbados Advocate* of September 13, refers to the success that has attended these exhibitions, and points out that the character of the exhibits has reached a higher standard each year.

Commenting on the fact that, owing to the extent of the sugar and cotton area, planters are devoting less space to the cultivation of provisions, thereby giving the small proprietor an opportunity to monopolize an industry attended with considerable promise of profit, the *Advocate* says:—

The tendency of the planters to reduce their provision areas leaves the small cultivator a better command of the market for such stuffs, and with strict attention to business principles he should by this means be able materially to improve his position.

Foremost among these principles is the selection of the crop to be raised, and next, its intelligent cultivation. These are the lessons which the Department of Agriculture desires to impress upon our peasantry, and which these exhibitions are intended to convey. As much time, trouble, and expense are absorbed in producing unmarketable vegetables and fruit as in raising marketable produce. Only the profits differ. Careless or ignorant selection in reference to the crops to be raised, or the stock to be bred, means loss of time and money, or in other words, absolute penury to the small grower who has only his labour and his land, and must therefore make the best use of them if he is to support himself and his family.



## MARKET REPORTS.

London,—September 3, 1907. 'THE WEST INDIA COMMITTEE CIRCULAR,' Messrs. KEARTON, PIPER & Co.; August 19, Messrs. E. A. DE PASS & Co.; 'THE LIVERPOOL COTTON ASSOCIATION WEEKLY CIRCULAR,' August 30, 1907.

ARROWROOT—St. Vincent,  $2\frac{1}{4}d.$  to  $2\frac{3}{4}d.$  per lb.  
 BALATA—Sheet,  $2/3$  to  $2/4$ ; block,  $1/8$  to  $1/8\frac{1}{2}$  per lb.  
 BEES'-WAX—£7 10s. to £7 15s. per cwt.  
 CACAO—Trinidad, 105/- to 112/- per cwt.; Grenada, 106/- to 110/- per cwt.  
 CHILLIES—Japanese, fair large red and yellowish, 19/- to 20/-; Zanzibar and Mombasa mixed, 17/6 to 20/-; Sierra Leone, 28/6 per cwt.  
 COFFEE—Jamaica, no quotations; Santos,  $29/4\frac{1}{2}$  per cwt.  
 COPRA—West Indian, £22 per ton.  
 COTTON—Barbados, 20d. to 22d.; Antigua, 19d. to 23d.; Nevis, 19d.; St. Croix, 20d. to 21d.  
 FRUIT—  
 BANANAS—Jamaica, 4/- to 5/- per bunch.  
 PINE-APPLES—St. Michael,  $2/6$  to  $4/6$  each.  
 GRAPE FRUIT, none on market.  
 ORANGES—Jamaica, none on market.  
 FUSTIC—£4 5s. to £4 15s. per ton.  
 GINGER—no quotations.  
 HONEY—16s. to 28s. per cwt. for dark liquid to yellowish.  
 ISINGLASS—West India lump, 2/- to 2/1 per lb.; cake, no quotations.  
 LIME JUICE—Raw,  $1/2$  to  $1/5$  per gallon; concentrated, £24 10s. per cask of 108 gallons; Distilled Oil, 3s. 1d. to 3s. 2d. per gallon; hand pressed,  $4/3$  to  $4/6$  per gallon.  
 LOGWOOD—£4 5s. to £4 15s.; Roots, £3 5s. to £4 5s. per ton.  
 MACE—West Indian,  $1/4$  to  $1/5$ ; broken, 1/-; Penang, bold red, part wormy,  $1/10$  per lb.  
 NUTMEGS—92's to 86's, 7d. to  $7\frac{1}{2}d.$ ; 115's,  $5\frac{1}{2}d.$ ; 139's to 144's,  $4\frac{1}{2}d.$  to  $4\frac{3}{4}d.$ ; 76's to 100's,  $2\frac{3}{4}d.$  per lb.  
 PIMENTO—Fair,  $3\frac{1}{8}d.$  per lb.  
 RUBBER—Fine hard Para, 4s  $9\frac{1}{4}d.$ ; soft fine, 4s.  $7\frac{1}{4}d.$  per lb.  
 RUM—Jamaica, common,  $2/7$  to  $2/10$ ; good, 3/- to 8/-; Demerara,  $1/0\frac{1}{2}$  to  $1/2\frac{1}{2}$  per proof gallon.  
 SUGAR—Crystals,  $16/9$  to  $17/9$ ; Muscovado,  $11/3$  to  $15/6$ ; Molasses,  $15/9$  to  $16/6$ .

Montreal,—August 9, 1907.—Mr. J. RUSSELL MURRAY.  
 (In bond quotations, c. & f.)

COCOA-NUTS—Jamaica, \$32.00; Trinidad, \$29.00 per M.  
 COFFEE—Jamaica, medium, 10c. to 12c. per lb.  
 GINGER—Jamaica, unbleached, 15c. to 16c. per lb.  
 MOLASSES—Antigua, 19c.; Barbados, 22c. to 23c. per Imperial gallon.  
 NUTMEGS—Grenada, 16c. to 17c. per lb.  
 PIMENTO—Jamaica, 6c. to  $6\frac{1}{2}c.$  per lb.  
 SUGAR—Grey crystals, 96°, \$2.50 per 100 lb.  
 —Muscovados, 89°, \$2.06 per 100 lb.  
 —Molasses, 89°, \$1.80 per 100 lb.

New York,—August 23, 1907.—Messrs. GILLESPIE BROS. & Co.

CACAO—Caracas, 19c. to 22c.; Grenada,  $22\frac{3}{4}c.$ ; Trinidad, 23c.; Jamaica, 20c. to 21c. per lb.  
 COCOA-NUTS—Jamaica, select, \$33.00; culls, \$20.00 to \$21.00; Trinidad, \$30.00 to \$32.00; culls, \$18.00 to \$20.00 per M.  
 COFFEE—Jamaica ordinary,  $7\frac{1}{2}c.$  to  $7\frac{3}{4}c.$ ; good ordinary, 8c. to  $8\frac{1}{2}c.$ ; good washed, 11c. per lb.  
 GINGER—Small to bold scraggy root, 15c. to  $15\frac{1}{2}c.$ ; small to bold bright,  $15\frac{3}{4}c.$  to  $16\frac{1}{2}c.$  per lb.

GOAT SKINS—Jamaica, 52c.; St. Kitt's, St. Thomas, and St. Croix, dry flint, 43c. to 48c.  
 GRAPE FRUIT—Jamaicas, \$4.50 to \$5.00 per barrel.  
 LIMES—\$4.50 to \$5.00 per barrel.  
 MACE—no quotations.  
 NUTMEGS—110's, 13c. per lb.  
 ORANGES—Jamaica, \$5.00 to \$6.00 per barrel.  
 PIMENTO— $6\frac{1}{4}c.$  to  $6\frac{1}{2}c.$  per lb.  
 SUGAR—Centrifugals, 96°, 3.94c. to 3.98c.; Muscovados, 89°, 3.44c. to 3.48c.; Molasses, 89°, 3.19c. to 3.23c. per lb., duty paid.

## INTER-COLONIAL MARKETS.

Barbados,—September 16, 1907.—Messrs. T. S. GARRAWAY & Co., and Messrs. JAMES A. LYNCH & Co., September 17.

ARROWROOT—St. Vincent, \$4.25 to \$4.75 per 100 lb.  
 CACAO—Dominica, \$18.00 to \$20.00 per 100 lb.  
 COCOA-NUTS—\$22.80 per M. for husked nuts.  
 COFFEE—\$9.50 to \$10.50 per 100 lb.  
 HAY—\$1.60 to \$1.80 per 100 lb.  
 MANURES—Nitrate of soda, \$62.00 to \$65.00; Ohlendorff's dissolved guano, \$55.00; Cotton manure, \$42.00; Cacao manure, \$42.00 to \$48.00; Sulphate of ammonia, \$72.00 to \$75.00; Sulphate of potash, \$67.00 per ton.  
 MOLASSES—no quotations.  
 ONIONS—\$2.25 to \$4.00 per 100 lb.  
 POTATOS, ENGLISH—\$1.50 to \$1.80 per 160 lb.  
 PEAS—Split, \$5.85 to \$5.90; Canada, \$3.10 per bag.  
 RICE—Demerara, \$5.80 to \$6.00 (177 to 180 lb.); Ballam, \$5.75 to \$6.00 per bag (190 lb.); Patna, \$3.90 to \$4.00; Rangoon, \$3.10 to \$3.20 per 100 lb.  
 SUGAR—Yellow crystals, \$3.75 per 100 lb.

British Guiana,—September 7, 1907.—Messrs. WIETING & RICHTER.

ARROWROOT—St. Vincent, \$10.00 to \$10.50 per barrel.  
 BALATA—Venezuela block, 32c.; Demerara sheet, 48c. per lb.  
 CACAO—Native, 16c. to 17c. per lb.  
 CASSAVA—No stock.  
 CASSAVA STARCH—\$9.00 per barrel.  
 COCOA-NUTS—\$12.00 to \$16.00 per M.  
 COFFEE—Creole, 13c. to 14c.; Jamaica, 13c. per lb.  
 DHAL—\$5.25 to \$5.50 per bag of 168 lb.  
 EDDOS—\$1.44 to \$1.68 per barrel.  
 MOLASSES—19c. per gallon.  
 ONIONS—Tenerife, 2c. to  $2\frac{1}{2}c.$  per lb.  
 PLANTAINS—20c. to 48c. per bunch.  
 POTATOS, ENGLISH—Bermuda, \$3.00 to \$3.50 per barrel.  
 POTATOS, SWEET—Barbados, \$1.44 to \$1.68 per bag.  
 RICE—Ballam, \$6.40 to \$6.50 per 177 lb.; Creole, \$5.25 to \$5.50 per bag (ex store); Seeta, \$6.00 per bag.  
 SPLIT PEAS—\$6.00 per bag (210 lb.).  
 TANNIAS—\$2.16 per bag.  
 YAMS—White, no quotations; Buck, \$2.40 per bag.  
 SUGAR—Dark crystals, \$2.25 to \$2.55; Yellow, \$2.90 to \$3.10; White, \$3.60 to \$4.00; Molasses, \$1.80 to \$1.90 per 100 lb. (retail).  
 TIMBER—Greenheart, 32c. to 55c. per cubic foot.  
 WALLABA SHINGLES—\$3.50 to \$5.50 per M.

Trinidad,—September 7, 1907.—Messrs. GORDON, GRANT & Co.

CACAO—\$23.50 to \$24.75 per bag (110 lb.); Venezuelan, \$24.25 to \$24.75 per fanega.  
 COCOA-NUTS—\$21.00 to \$22.00 per M., f.o.b.  
 COCOA-NUT OIL—\$1.15 per Imperial gallon (cask included).  
 COFFEE—Venezuelan,  $6\frac{1}{2}c.$  to 7c. per lb.  
 COPRA—\$4.00 to \$4.25 per 100 lb.  
 DHAL—\$4.40 to \$4.60 per 2-bushel bag.  
 ONIONS—\$1.50 to \$1.60 per 100 lb. (retail).  
 POTATOS, ENGLISH—\$1.25 to \$1.40 per 100 lb.  
 RICE—Yellow, \$5.60 to \$5.80; White, \$5.75 to \$6.00 per bag.  
 SPLIT PEAS—\$5.50 to \$5.75 per bag.  
 SUGAR—Grocery grades, \$3.00 to \$3.25 per 100 lb.





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### Industrial Progress in Montserrat.

**A** review of the industrial position in Montserrat appeared in the *West Indian Bulletin* (Vol. VII, pp. 1-15), and it was shown that while in former years sugar formed by far the largest article of export, during the past decade the output of this commodity had greatly diminished, until, as an article of export, it had become less valuable

than limes and lime juice. From the facts recorded in the article above-mentioned, it appeared improbable that sugar would again become the principal industry; the lime industry gave promise of increasing in importance, but it was stated that 'it is in the direction of cotton that we have to look for any considerable and immediate improvement in Montserrat.'

As two years have elapsed since this review was written, it is of interest to inquire what has resulted during that period.

A table showing details of the principal exports from Montserrat during the past sixteen years appears on p. 309 from which it will be seen that the predictions mentioned above have been verified. There has been steady progress, and the exports have risen in value, so that in 1906 they amounted to £23,182 in value, a higher figure than has been realized since 1896, which period marked the end of the effort to maintain sugar as a principal crop.

The prediction that cotton would prove to be the crop on which reliance would have to be placed has been fully verified, for the Blue-book records show that in the civil years 1905 and 1906, the exports of cotton were valued at £4,045 and £6,637 respectively.

Statistics based on the civil year and on the value of the exports do not, however, give the clearest insight into the progress of the industry, for the end of the civil year falls in the middle of the cotton crop, and a civil year, therefore, indicates part of one crop and part of another, while values are changing from year to year, cotton for statistical purposes at one period being valued at 1s. per lb., and at another at 1s. 6d.

The progress of the industry is better seen by



having regard to the amount of cotton produced by each crop, and this return is here given.

Crop of 1903,	35,657 lb. lint,	estimated value	£1,788
" " 1904,	27,606 " " "	" "	1,380
" " 1905	70,748 " " "	" "	3,537
" " 1906	98,262 " " "	" "	6,637
" " 1907	164,430 " " "	" "	12,189

From 1903 to 1905 the value of the lint for statistical purposes was taken at 1s. per lb.; for 1906 the average value was 1s. 4d. per lb., while for 1907 clean lint was valued at 1s. 6d. per lb., and stained lint at 9d.

In 1906 cotton ranked as the principal article of export, and when the returns of the civil year 1907 are compiled it will be found that cotton far exceeds other exported products in value. The cultivation is being rapidly extended, and if circumstances are reasonably favourable, the progress of the last two or three years should be steadily maintained and the export should increase in quantity and value.

Montserrat now appears to be arriving at the point when cotton is taking the place of sugar: it remains to be seen how far it is capable of replacing that industry. It is not contemplated that it will, at any rate for a long time, produce an export comparable in value with sugar prior to 1883, but it will play the leading part in restoring that prosperity which the Presidency is just beginning to experience.

The lime industry has now been restored, and has once more reached a degree of importance comparable with that which it occupied before its serious setback by the hurricane of 1899. The industry is being steadily extended and the exports should increase year by year, thus adding materially to prosperity. Large areas are being planted in lime trees, and, what is a matter of considerable local importance, a good proportion of this planting is taking place on the lime estates of Olveston and Woodlands, thus restoring an important industry in a district where for some years there has been little of industrial importance.

The manufacture of citrate of lime is beginning to replace the preparation of concentrated lime juice and it is contemplated that this improvement will be rapidly extended until, probably, citrate of lime will entirely replace concentrated juice.

It is satisfactory to note that the export of Papain has not been extinguished, as was feared might be the case. The exports of 1905 and 1906 are valued at £1,636 and £1,095 respectively. It is possible that the advent of cotton may prejudicially affect this industry, and there are complaints of its decadence.

The export of fruit and vegetables continues to

increase and it is hoped that progress in this direction may be maintained.

Reviewing the position generally, the exports indicate a healthy expansion of industries and an amount of activity which is inspiring. If the cotton industry, upon which the prosperity of Montserrat now very largely depends, proves to be a stable one, the prospects, as judged by the statistics given in the table, on p. 309 are very favourable. These statistics however do not record the whole story.

There is an amount of activity in Montserrat which is quite cheering; the cultivation of cotton and of limes is being extended so that properties whereon little cultivation has been carried on for many years are now being worked once more, and there is reason to hope that the prosperity of the island is even more fully restored than the statistical position indicates.

For many years the north-eastern portion of the island was an abandoned area in which practically no cultivation (beyond a few peasants' patches) was carried on. Now this district is being opened up and planted in cotton, so that there is a fair prospect of a belt of cultivation extending right through a tract of country which for many years has lain waste.

Similar activity is being displayed in other directions. These efforts have not yet made an impression on the statistical returns, but they will come into account in this direction later.

The energies of the inhabitants are thus well occupied in pushing the developments immediately in view. Probably by the time these developments have matured, new industries and new lines of development may come into sight. In this respect the prospects of Montserrat are distinctly hopeful.

While being hopeful one must guard against being reckless, and in years of moderate prosperity precautions should be taken to set things in order to see that buildings, implements, and stock are well replenished, and that reasonable reserves are created for it must be remembered that all agricultural efforts are subject to striking vicissitudes, that seasons may prove unpropitious, and prices may fall. The prosperous planter should be alert to secure his position against such vicissitudes and, while prosperous, he should ever be accumulating information concerning new crops and new industries which may supplement or supplant his existing industry should circumstances dictate such changes.

Prosperity therefore should lead to greater and wider activity instead of to easy content and narrow outlook.



## DEATH OF MR. W. R. BUTTENSHAW.

It is with deep regret that we have to report the death of Mr. W. R. Buttenshaw, which took place suddenly in Calcutta on the 9th of September.

Mr. Buttenshaw graduated in Arts and Science at the University of Aberdeen, and continued his studies in Agricultural Science at the University of Halle. He entered the service of the Imperial Department of Agriculture for the West Indies as Lecturer in Agricultural Science at Jamaica in 1899, and was appointed Scientific Assistant in charge of publications at the Head Office at Barbados in 1903. In both positions he rendered important services to Agriculture in the West Indies, and readers of the *Agricultural News* are familiar with his interesting and valuable editorials.

In 1907 he was appointed Botanist in the Indian Agricultural Service, and left Barbados in May to take up his duties there.

Mr. Buttenshaw won the friendship and esteem of his colleagues, and the news of his sudden death at the early age of thirty will be received with feelings of sorrow by them, and by his numerous friends in the West Indies.



## SUGAR INDUSTRY.

### West Indian Sugar Industry.

Particulars as to the amounts of cane sugar produced each year, from 1900 to 1905, in the several British West India Islands and British Guiana, the sugar exports from the West Indies during the same period, and the quantities of these exports taken by the United Kingdom, United States, and Canada respectively, form the subject of a return issued by the Board of Trade, and reproduced in the *West India Committee Circular* of September 3 last.

The total sugar production (including that of British Guiana) was 4,756,000 cwt. in 1900, increasing to 5,679,000 cwt. in 1901, and reaching high-water mark with a yield of 6,031,000 cwt. in 1902—the year in which the Brussels Convention was signed. The total sugar yield decreased each year from 1902 to 1905, falling to 5,113,000 cwt. in the last-named year, this representing a decline of nearly a million cwt. as compared with the return of three years previous. The short crop of 1905 must, however, be partly attributed to the drought experienced during the growing season of the sugar-cane. The sugar yield of 1906, it is satisfactory to note, again shows a good increase, being given as 5,521,000 cwt., or over 400,000 cwt. in advance of the previous year's crop.

What has been said above of the West Indies in general practically applies to each of the chief sugar-producing islands, taken separately. Jamaica, Barbados, St. Kitt's-Nevis, Trinidad, Antigua, all show an increase in amount of sugar produced from 1900 to 1902 or 1903, and an annual decline in the returns since then down to 1905. Antigua, however, had a bad year in 1901, when the yield fell below

normal, and Trinidad had a good year in 1904, the sugar yield being 1,015,000 cwt. as compared with 956,000 cwt. in 1903. But in 1905 the Trinidad crop fell to 764,000 cwt. The last *Annual Report* on Jamaica points out that the area devoted to cane cultivation during 1905-6, as well as the amount of sugar exported, shows an increase in comparison with the previous year, so that low-water mark was probably reached in that island in 1905.

The steady decline in sugar production seen in Barbados, St. Vincent, and Montserrat, during the past few years however, indicates the replacement of the crop by cotton, and it is unlikely that the sugar-cane will recover the lost area.

The sugar production of British Guiana represents about two-fifths of the total yield of the British possessions in this part of the world. As the figures of the annual production are not available, the return in question gives the domestic exports of sugar from 1901 to 1906, from which it would appear that the yield of sugar increased steadily each year from 1900 to 1903, dropping considerably in 1904, but nearly recovering itself in 1905. The domestic export of sugar from British Guiana for the year ending March 31, 1901, was 1,895,000 cwt. By the end of the year 1903-4, this had increased to 2,519,000 cwt., while the domestic export of sugar for 1905-6 was 2,331,000 cwt.

The total quantity of sugar exported from the British West Indies and British Guiana was 4,315,000 cwt. in 1900, reaching a maximum of 5,401,000 in 1902, while in 1905 it amounted to 4,642,000 cwt. During this period the shipments to the United Kingdom have increased by half of what they were in 1900; the exports of sugar to the Dominion of Canada have almost doubled; but the quantity of West Indian sugar shipped to the United States in 1905 was very little more than one-third the amount sent in 1900. The United Kingdom took 855,000 cwt. in 1900 and 1,225,000 cwt. in 1905. Canada, which took no more than 116,000 cwt. of West Indian sugar in 1900, imported the enormous quantity of 2,246,000 cwt. in 1905. On the other hand, the exports of sugar from these colonies to the United States of America, which in 1901 totalled no less than 3,860,000 cwt., had by 1905, declined to 1,123,000 cwt.

Apart from the above three countries, an average quantity of about 50,000 cwt. of sugar is reported as being annually exported from the British West Indies to countries which are not named.

### Sugar Prospects in Demerara.

The *Demerara Argosy* of September 21 contained the following note on the prospects of the present season's sugar crop in the colony:—

Canes of all ages are now suffering from the severe dry weather and growth is rapidly being checked. The fact that excessive rains prevailed during the first six months of the year renders the need for heavy showers all the more imperative now, as canes have not rooted deeply. The long dry season has however fairly set in, and under normal weather conditions, rains cannot be expected before late in November.

Canes are thin, short, and lacking in juice. A few estates grinding plant canes fourteen to fifteen months old, report high yields of sugar, but ratoon canes twelve months old are proving very disappointing. It is now certain that the average yield from October, November, and December canes will be the poorest obtained for a long number of years. Cane juice is reported to be of good quality and this is some consolation, in view of the otherwise depressing outlook.





## WEST INDIAN FRUIT.

### FRUITING OF DATE PALMS AT DOMINICA.

The following interesting particulars with reference to the fruiting of date palms at the Botanic Station, Dominica, have been forwarded by Mr. Joseph Jones, Curator of the station:—

Seeds of several kinds of the best date palms, including the Tafilat variety, were obtained by Kew from the East during 1890 for distribution among the then newly formed Botanic Stations in the West Indies. Dominica's share of plants was received via Antigua Botanic Station during 1891. During the following years a considerable number of date palms were distributed in Dominica, and a dozen were planted in the Botanic Gardens. For several years past a number of female plants in the gardens have produced flowers. Early in the present year two flower clusters appeared on a male date palm for the first time. They were cut and hung in the office. Some weeks later the female plants also produced flowers, and the male flower clusters were then placed near to the inflorescences. Fertilization was effected, and several clusters of dates of good quality were produced.

When the dates began to ripen birds proved very troublesome and the clusters had to be cut and ripened indoors. The fruits are very apt to decay owing to the damp weather experienced during August and September, but probably this tendency might be overcome by dipping or spraying the clusters, immediately after they are gathered, in a 5-per cent. solution of formalin.

The experiment has shown that dates can be produced on the Leeward Coast of Dominica. It is now known that the best dates are propagated by suckers from standard varieties, and not by seeds. An importation of suckers of the best kinds is necessary for the continuance of this experiment.

### FRUIT IN PORTO RICO.

The fruit industry of Porto Rico appears to be in a progressive condition, and since the produce finds a preferential market in the United States, the fruit-growing capabilities of the island will no doubt undergo considerable development in the near future. The last *Annual Report* of the British Consul stationed at Porto Rico contains the accompanying particulars as to the present conditions and outlook:—

There are now some 7,000 acres of citrus plantation in the island in various stages of development, but none as yet have arrived at the full-bearing stage. Orange land now

can be bought at any price between £5 and £20 per acre.

During the year oranges to the value of £60,695 were exported, all to the United States.

The cultivation of pine-apples, both for canning and for export whole, has grown considerably in favour. There are several canneries in active operation, the product of which finds ready sale in New York. This fruit is largely grown as a by-crop amongst the orange trees whilst they are maturing.

There was an increased export of citrus fruits during the year, principally owing to some of the new plantations starting shipments.

Prices in New York were as a rule more favourable, caused in a great measure no doubt by the better condition of the fruit on arrival, thanks to greater care than heretofore being bestowed on packing for market.

Important shipments are spoken of for next year, when it is expected that, with the advantage of cheap rates over western competition, Porto Rico will take a prominent position in the fruit trade.

### RUBBER EXPERIMENTS IN BRITISH GUIANA.

The most recent report of the Superintendent of the Onderneeming Farm School, British Guiana, gives the accompanying particulars relating to the experimental work in rubber cultivation that is being carried on there:—

Experiments in rubber cultivation continue to be carried out. The Para rubber trees (*Hevea brasiliensis*) have made excellent growth; two of the older trees blossomed during the year but the high winds dissipated the blossoms, and consequently no seeds were obtained. The South American rubber trees (*Castilloa elastica*), and the West Africa (*Funtumia elastica*) are also growing vigorously. No seeds have yet been obtained from the *Castilloa* trees, but the nursery has been kept stocked with young plants of *Funtumia*, and there have been sold to sugar planters and others in all parts of the colony 2,316 plants during the year, and 600 more last month. *Sapium Jenmanii* has been included in the cultivation.

The nursery, which has been enlarged, is kept stocked with economic plants for sale, but it does not seem to be generally understood that Onderneeming is an agricultural station under the management of the Director of Science and Agriculture, and that certain plants can be obtained here at the same prices as those charged at the Botanic Gardens, Georgetown.



PRINCIPAL EXPORTS OF MONTSERRAT FOR THE YEARS 1891-1906 (INCLUSIVE).

The progress of the agricultural industries of Montserrat, discussed in the editorial, is illustrated very forcibly by the accompanying tabular statement :—

	1891	1892	1893	1894	1895	1896	1897	1898	1899	1900	1901	1902	1903	1904	1905	1906
Cattle	...	£ 792	£ 195	£ 569	£ 677	£ 804	£ 951	£ 1,362	£ 1,485	£ 1,861	£ 1,693	£ 2,007	£ 1,618	£ 2,390	£ 2,219	£ 1,870
Other stock	...	358	186	337	460	619	1,059	518	976	1,316	1,079	796	1,042	1,218	1,349	684
Fruit and other vegetables (fresh)	...	466	540	427	387	634	480	218	275	80	283	601	591	727	886	1,141
Lime juice and limes	...	9,418	8,844	729	6,802	4,261	10,364	5,154	4,926	368	1,110	5,465	2,342	7,803	6,833	6,053
Sugar	...	10,417	20,559	15,930	5,252	14,437	5,685	3,074	4,416	2,052	5,241	5,433	4,592	3,656	2,376	4,096
Drugs (Papain)	...	115	84	148	426	501	451	649	281	359	866	1,763	2,000	1,627	1,636	1,905
Essential oils	...	567	399	108	1,182	722	1,158	937	863	56	299	345	188	287	284	157
Cotton	...	...	...	...	...	...	...	...	...	...	...	...	1,486 lb.	1,380 lb.	4,045 lb.	6,637 lb.
.. (pounds of lint)	...	...	...	...	...	...	...	...	...	...	...	...	36,657 lb.	27,606 lb.	82,312 lb.	89,148 lb.
Total exports (excluding coin and bullion)	...	31,013	32,715	22,502	16,819	25,402	21,193	13,549	15,569	7,315	11,393	17,405	15,974	21,140	21,411	23,182

PRUNING CACAO TREES.

An article containing a good deal of practical information on the above subject appears in the June and July number of the *Bulletin* of the Jamaica Board of Agriculture, being contributed by Mr. W. Cradwick, Travelling Instructor in Agriculture under the Board.

As the subject is one of interest outside Jamaica, a résumé of the chief points in the article is given below :—

Pruning will naturally begin when the young cacao plant commences to fork and send out primary branches from the crown. Not more than three of these primary branches should be allowed to remain, and care should be taken to leave three strong and well-balanced shoots.

Suckers can be removed at any time : later on, the question of secondary or side branches will demand attention.

If the tree is strong and vigorous, the soil fertile, and the situation sheltered, it is recommended that all secondary shoots should be removed from the primary branches for a distance of 3 feet from the fork of the tree, or point where the primary branch is given off. If conditions are not so favourable, and the tree does not show so much promise, it will be sufficient to remove all secondary shoots given off from the first 12 or 18 inches of the primary branches. As some of the young secondary shoots are much stronger than others, special care should be exercised in pruning for secondary branches to leave those shoots which appear most vigorous, removing any intermediate weaker ones.

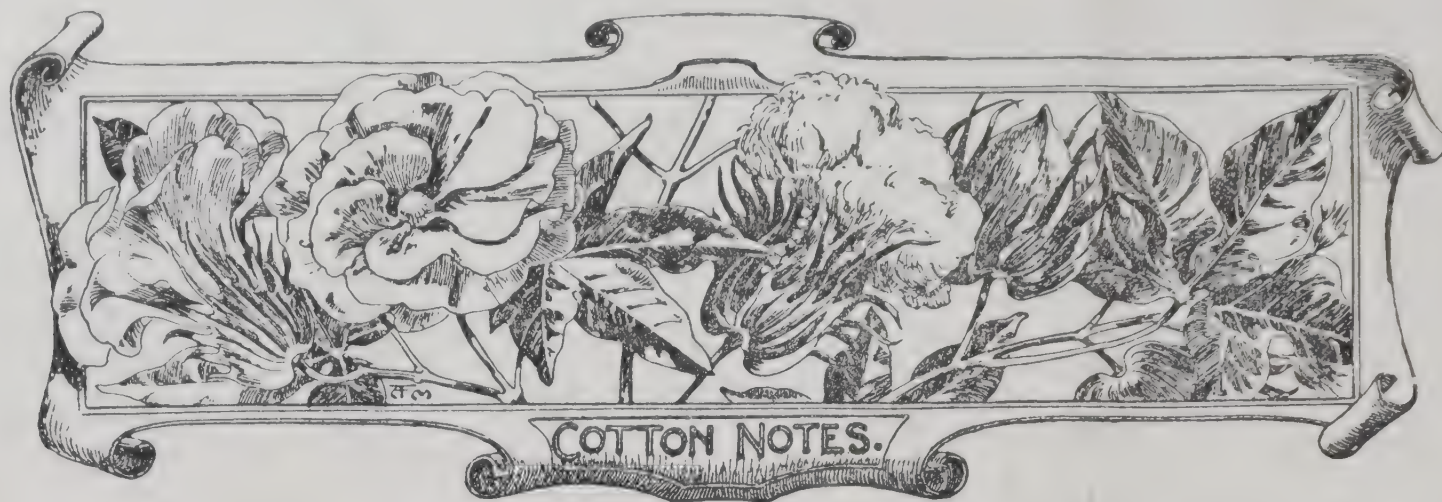
The ideal type of cacao tree for the planter to aim at is described by Mr. Cradwick as one having a main stem from 3 to 4 feet in height, three primary branches, and secondary branches given off alternately from either side of the primary branches, there being a distance of about 1 foot between the first and second shoot, 9 inches between the second and third, while further up the branch the secondary shoots gradually become closer as they get further from the crown of the tree. Such a tree would be about 10 feet in diameter, and doubt is expressed as to whether trees occupying more space are profitable. Ideal conditions are required to produce ideal trees, and among these conditions are mentioned a moist, rich soil, and a heavily shaded situation. As the tree grows it can stand more light, more wind, and eventually will grow in positions exposed to full sun and heavy breezes.

As the result of unfavourable conditions, the cacao plant may begin to branch at little more than a foot from the ground. Trees which branch low are seldom vigorous, and in such a case it is recommended that the plant should be allowed to send up a sucker as soon as it has sufficient vigour, the sucker taking the place of the original plant, which is cut back a little later.

Where it has been found necessary to remove big branches from the trees, which should only be in case of accident, Mr. Cradwick draws attention to the importance of care in this operation. A sharp saw or cutlass should be used, the wound should be pared smooth with a good sharp knife, and smeared over with a composition consisting of half Stockholm tar and half grease, melted together and applied warm. It is through the medium of such exposed surfaces that the spores of many fungus diseases effect an entrance into the system of the tree and cause endless trouble and loss to the grower, but this may be prevented by the precaution above described.

Where old cacao trees have become damaged, it is advised that they should be allowed to send up suckers, which should be treated in the same way as young plants, and replace the old tree as soon as possible. On good land these suckers will soon come into bearing.





### WEST INDIA COTTON.

Messrs. Wolstenholme & Holland, of Liverpool, write as follows, under date of September 16, with reference to the sales of West India Sea Island cotton:—

The demand for Sea Island cotton has been extremely limited since our last report.

Spinners are disinclined to operate, pending the opening of the Charleston and Savannah markets for the American Sea Island crop, which will guide them as to the future course of prices.

We have had an offer to-day of choice Georgias at 17*d.* per lb., this being about 5*d.* per lb. below the extreme prices asked during the season.

We therefore expect declining markets for all Sea Island growths for the present.

The quotations of West Indian Sea Island are reduced 1*d.* per lb.

Sales include Barbados, at 22*d.*, St. Croix, 17*d.* to 18*d.*; Nevis, 17½*d.*; and a few stains.

### SEASONABLE NOTES.

Recently a number of important field demonstrations have been held in different parts of Barbados, when the officers of the Imperial Department of Agriculture have met the planters in the field to discuss the various methods of applying Paris green to the cotton plants.

It has been recognized that on many estates there has been considerable waste in the application of Paris green, and these meetings have been held in order to demonstrate to the planters not only the best methods of applying the powder but also the amount that should be used.

Very great interest has been taken in the demonstrations, and on each occasion, almost all the planters living in the district have turned up at the meetings.

The various appliances for distributing Paris green have been shown at work in the field, and the merits or otherwise of each contrivance discussed.

On each occasion the Paris green was distributed by means of the powder gun, powder bellows, the tickling-burg bag, tin shakers, and coarse bagging. Most planters are strongly in favour of the ticklingburg bags. These have many points in their favour; they are cheap, easy to work, difficult to get out of order, and they do most effective work. They have, however, one disadvantage; when the leaves of the plants are wet, and the bag comes in contact with them, the Paris green and lime cake inside.

There are many planters who like the bellows; they do

very good work, distributing the powder in a very fine cloud; there is no difficulty in working them, and they do not readily get out of order. They are also comparatively cheap.

As regards the powder guns, only a very few planters care to adopt them. When properly used they can be made to do good work, but unfortunately, with the class of labour usually employed, they often get out of order. These guns are also very expensive, costing about \$8.00 each.

There were a few planters who were in favour of tin-shakers, but with these, it is difficult to distribute Paris green uniformly; when they are employed it is usual to find one or two leaves with a very thick covering of Paris green, while practically none may be found on most of the other leaves.

The coarse bagging is decidedly wasteful, and ought never to be used.

In deciding upon any contrivance for the application of Paris green, there are two points which must always be taken into consideration: first, the machine must be simple in construction, easy to work, and not easily got out of order; and second, it must be an instrument which will apply just sufficient of the powder, and—unless extreme measures are used—will not give out more than is necessary.

At these demonstrations, the proportions in which to mix Paris green and lime were freely discussed, and although very extreme cases were brought forward, such as mixing 1 lb. of Paris green with 30 lb. of lime, the opinions of some of the largest cotton planters went to show that when 6 lb. of lime are mixed with 1 lb. of Paris green, there is no difficulty in controlling the worms; and that when the plants are half-grown, they do not require more than 1 lb. of Paris green per acre.

It is satisfactory to notice that the planters are beginning to recognize that the control of the cotton worm is largely a matter of keen watchfulness on their part; and that by attacking the pest at the right time there is a great saving both of Paris green and worry.

### RATOON COTTON.

On some estates in Barbados ratoon cotton is this year being kept, as it was thought there might be a chance of supplementing to some extent the short yields of last season. The quality of ratoon cotton however, and its influence on the market do not appear to have been sufficiently considered, although these things have been frequently discussed in the pages of the *Agricultural News*.

Mr. Charles M. Wolstenholme, the well-known cotton broker of Liverpool, wrote in April 1905:—‘I hope you will be able to stamp out the ratooning of cotton in Barbados and



St. Vincent. The planters may find it to pay for a season, but it spells ruin for the industry.' (*Agricultural News*, Vol. IV, p. 134.)

Samples of ratoon cotton have been recently examined and the truth of Mr. Wolstenholme's remarks is well recognized. The cotton is very weak, and any which may be shipped should be specially marked to indicate that it is second quality. Failure to do this will be likely to cause spinners to look upon West Indian cotton with suspicion.

### SEA ISLAND COTTON.

The extracts from Mr. Gordon's paper on Sea Island cotton, which were begun in the *Agricultural News* of August 24, are concluded in the present issue. It will be noticed that Mr. Gordon refers to the re-introduction of cotton cultivation into the West Indies, and he certainly thinks the future holds good prospects for growers of the Sea Island variety.

There are very few large Sea Island plantations in Florida and Georgia. Generally speaking, the cotton is raised on small farms by what are known as 'one-horse farmers,' who do a large portion of their own farm work. They represent the best class of farmers that the world produces, being conservative, thrifty, and men of small but independent means.

The Georgia and Florida cotton is baled in rectangular packages, weighing about 400 lb. On the Islands it is put up in bags weighing about 350 lb. The bagging used is a close-woven jute, 50 inches wide, and weighing 2 lb. to the yard. The edges are sewn together with hemp twine. When a good quality of bagging is used, it affords satisfactory protection to the cotton, and the packages are received at the mills in much better shape than are the bales of ordinary Upland cotton.

Domestic spinners receive their cotton uncompressed, and without any bands. Foreign shipments have first to be compressed.

The characteristics required of Sea Island cotton are : that the staple shall be long, strong, fine, silky, and uniform ; that the preparation shall be smooth and clean, and free from imperfections and waste.

The Carolina planters have succeeded in producing, in some instances, a staple from  $2\frac{1}{4}$  to  $2\frac{1}{2}$  inches long, and the genuine Island cotton is spun into counts of yarn ranging from 120's up to 400's. It is claimed that the finest qualities have been spun as high as 2,000's.

Richard Marsden, in his standard work on 'Cotton Spinning,' has well said that 'Practical skill and high discriminative power are needed in classing to select cotton of the proper quality to make any description of yarn.' This is particularly true of Sea Island cotton. As has already been stated, the same stalk produces different qualities of staple at different seasons of the year. In the same locality, owing to differences in the quality of the seed planted, in the amount of fertilizer used, and in the richness of the soil, cotton of widely varying value is produced. Furthermore, one spinner may require an entirely different style of cotton from another, length being the prime requisite in one case, strength in another, fineness in another, glossy, clean appearance in another, freedom from waste in another, etc., etc. For these reasons, it has been found impossible to engage successfully in a system of buying cotton at innumerable interior points, and shipping it through to the mills without concentration and classification under the direction of an expert. For the same reasons, Sea Islands have never descended to the depth of a future contract business.

One of the most interesting features in connexion with the Sea Island trade at the present date is the effort on the part of West India planters to produce, upon its native soil, the Sea Island cotton which, for more than a century, has been neglected. Under the fostering care and intelligent guidance of Sir Daniel Morris, Imperial Commissioner of Agriculture for the West Indies, an enormous amount of information has been acquired and disseminated throughout the islands, and an earnest, practical effort has been made to revive the culture of Sea Island cotton, and no small degree of success has already attended these efforts.

In spite of the smallness of the crop, it has never been possible to corner Sea Island cotton, one reason being that substitutes can nearly always be found, though they are often unsatisfactory. One of these substitutes is Yannovitch Egyptian cotton. The introduction of this cotton has been a distinct advantage to Sea Island cotton producers. Its wide-spread consumption has created a demand for goods made from extra-stapled cotton, and caused the installation of machinery which might, otherwise, never have been brought into use.

The result has been that the lower grades of Sea Islands have been favoured by spinners of Yannovitch cotton, whenever the two qualities approximated the same price, and this has prevented the former from being unsaleable when, in large crop years, the better grades of Sea Islands supplied the demand of the Sea Island spinners. In this connexion, it is worthy of note that the Sea Island cotton shows a far greater persistence than any of the long-stapled Egyptian growths. This is an important matter for spinners. They must know that a certain quality and quantity will be produced from year to year, with a reasonable degree of regularity. In spite of irrigation, the production of lint-cotton per acre is falling off in Egypt, and nearly all the extra-stapled cottons there have gone out of existence.

In conclusion, there is one thought which I wish to suggest to cotton manufacturers, and it is this: At present Sea Island cotton is spun by only a very small number of spinners. Yet the spinner who looks to the future and is determined to succeed, is likely to be constantly saying to himself, 'Spin finer, and then finer, and yet again finer.' In order to do this, however, he must have the proper raw material. Cheap cotton will produce poor yarn; you cannot fool the machinery, and, therefore, it is likely, as time goes on, that an increasing number of you will be seeking Sea Island cotton and will wish to have a regular, abundant, properly classed and reasonably priced supply. To all such I would say that the territory where Sea Island cotton is now raised is capable of producing twice, or even three times the amount of Sea Island cotton now grown. Not one-third of the available land is under cultivation. A year ago the crop reached a total of 125,000 bales, which was the largest on record. This year, owing to reduced acreage, and unfavourable weather, it will not reach 60,000 bales, but, in my opinion, given an abundant supply of labour, a crop of 300,000 or even 500,000 bales, weighing 400 lb. each, could be produced.

There is another feature in this connexion which will probably appeal to spinners whose mills are at a distance from the cotton fields. The cost of the raw material is so small an item in the total cost of goods manufactured from Sea Island cotton that transportation charges have very little effect upon the price which a spinner can pay. It therefore follows that the competition of the mills situated in the South, while it may prove injurious to Northern mills which attempt to spin coarse numbers, is not likely to hurt the mills spinning fine numbers.



## EDITORIAL NOTICES.

Letters and matter for publication, as well as all specimens for naming, should be addressed to the Commissioner, Imperial Department of Agriculture, Barbados.

All applications for Copies of the 'Agricultural News' should be addressed to the Agents, and not to the Department.

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# Agricultural News

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## NOTES AND COMMENTS.

### Contents of Present Issue.

The editorial reviews the industrial progress which has taken place in Montserrat during late years. As a result of the remarkable increase in the cotton crop from year to year, this product is now the principal article of export from the island. Sugar is on the down grade, but lime cultivation is again flourishing and minor industries are in a satisfactory condition. Further information with regard to the exports from Montserrat during the past sixteen years is given in tabular form on p. 309.

A review of the sugar industry of the West Indies during the past five years is given on p. 307.

Date Palms at the Botanic Station, Dominica have this year produced fruit of good quality (p. 308).

A short article on the pruning of cacao trees appears on p. 309.

The cotton pages (310-11) contain Seasonable Notes, etc., together with the concluding portions of Mr. Gordon's paper on Sea Island cotton.

An article giving information with regard to scale insects which attack cotton, and a note on the cotton worm, appear under Insect Notes (p. 314).

Mr. Cunningham-Craig's report on the metamorphic rocks of Trinidad is reviewed on p. 317.

Information with regard to fungus diseases of plants in Trinidad and in Ceylon form the subject of short articles on p. 318.

### Rice Prospects in Berbice.

Reports from Berbice states that the area devoted to rice cultivation this year is greater than was the case last year.

With regard to crop prospects for the present season, it appears, from information collected by a representative of the *Demerara Daily Chronicle* that different opinions are expressed in different parts of the country. In the neighbourhood of Borlam on the Corentyne coast too much rain fell before the planting season, but since then, and more especially at the time of blossoming, there was a deficiency of moisture, with the result that there is too much of what is termed 'wind rice.' Reports from Letterkenny, Bloomfield, Albion, Port Mourant, Lochabar, and Vryheid districts are all favourable and the harvest promises to be abundant. In the Canje, however, growers complain that the yield will be disappointing, owing to lack of water.

The East Indians and blacks on the east bank of the Berbice river, who planted early in the season, are expected to have exceedingly good yields. Villagers of Rotterdam, however, suffered very much from excessive rain. The price of rice in Berbice is fluctuating from 18c. to 20c. per gallon just now.

### Agricultural Work in Ceylon.

The Director's *Report* for 1906 on the Royal Botanic Gardens, Ceylon, commences with a review of the work done during the ten years which have elapsed since the inception of the Department in 1896.

Ten years ago the Department was purely botanical; the area of the cultivated gardens was 292 acres; its higher staff consisted of a Director and two Curators; and its agricultural activities were limited to introducing and distributing new products.

Ceylon has latterly become famous as a pioneer country in rubber cultivation and production, its camphor industry is very profitable, and the cultivation of tea, cocoa-nuts, cacao, cardamoms and coca is on a satisfactory footing. It is in connexion with the development of the above industries—more especially with rubber, camphor, and cacao—in devising the best methods for the destruction of insect and fungoid pests, and in giving advice and assistance to planters that the newly formed Department found abundant scope for its activities. To-day the higher staff of the Department is ten in number, and the area of the cultivated gardens has increased to 597 acres. Two journals have been started, and a third edited, pamphlets of information have been issued, and a library and laboratory established.

As a result of the work of the Department, too, 100,000 acres of rubber have been planted, 900 acres of camphor, and 300 or 400 acres of cotton. Canker and other diseases of cacao, which threatened the extinction of the industry in Ceylon some years ago, have been kept well in check by the adoption of the measures recommended by the Department.

The reports of the Mycologist, Entomologist, Chemist, Scientific Assistant, etc. are issued as supplements to the report of the Director.



### Agriculture in Dutch Guiana.

Cacao, bananas, rubber, sugar, rice and balata are stated by the latest British *Consular Report* to form the chief agricultural products of British Guiana. Cacao plantations are reported to be suffering severely from 'kroloto,' or witch-broom disease, which has been prevalent in the colony for many years. Experiments are being carried on in the hope of finding a method to stamp out the disease, so far, however, with but indifferent results.

Since the prospects of the cacao industry are not encouraging, planters are turning their attention to banana growing for export, and under a subvention from the Colonial Government the United Fruit Company of Boston has agreed to purchase all the bananas produced on 7,410 acres, to be planted by May 1908.

A beginning has been made in planting Para rubber, but it is too soon to say anything as to results. The tree *Hevea Guianensis* exists in small number in the interior, but the yield of rubber is small and of poor quality.

### A New Rubber Tree.

A new rubber-producing tree, belonging to the same natural order as *Hevea brasiliensis* and *Manihot Glaziovii* is reported from Mexico, to which the name *Palo Amarillo* has been given. This tree is reported as thriving well on rocky soil, and occurs in several States of Mexico at a height of 1,500 to 1,900 metres, where the temperature varies from 62.5° to 68° F.

The latex of *Palo Amarillo* is yellowish-white, thin, and does not coagulate readily. A yield of 1.75 pints per tree was obtained in recent experimental tappings. It is expected that the trees will stand three tappings per annum for ten years. The latex contains a large proportion of resin, this being reported as 40 per cent. and the amount of rubber present as 18 to 20 per cent. It is stated, however, that a process has recently been devised for separating the two substances, with the result that rubber of good quality has been obtained, while the resin yielded an excellent varnish. The value of the rubber is estimated at 4s. per lb. and that of the resin at 1s. 6d. per lb.

### Sorghum Poison.

It is well known that sorghum or Guinea corn (*Sorghum vulgare*) in the early stages of growth frequently acts as a poison to cattle, and death has often resulted where animals have broken into a field and commenced to feed on the growing corn. The mature sorghum, however, is a safe food, and may be fed to stock with impunity, as it is very rarely indeed that bad results have followed its use. The poisonous properties of the young sorghum plant is due to the presence of prussic acid, but the amount present gradually becomes less as the plant gets older, and has practically disappeared by the time the seeds have ripened.

The *Queensland Agricultural Journal*, in a note

on sorghum, advises that a good drink of sweet milk, or of molasses diluted with water should immediately be given to any animal showing symptoms of illness after feeding on sorghum, as in experiments carried on by the Queensland Department of Agriculture, this has been attended with good results. Sweet potato vines also contain a glucoside which yields prussic acid, and the *Queensland Journal* would attribute occasional deaths of pigs, etc., to this cause, although in the West Indies this vine is consumed in large quantity by cows, pigs, etc., and as far as is known no fatal results have attended its use.

### Agricultural Conditions in Hayti.

In a recent report of the U. S. Consul at Hayti, a résumé of the condition and prospects of the principal crops is given.

Coffee is the principal product of the republic, but for the past three years this has fallen below the average, though there was an improvement last year. The cotton industry is extending, and it is hoped that it will prove a considerable source of prosperity in the future. By far the greater part both of the coffee and the cotton are shipped to Europe.

It is expected that the production of cacao in Hayti will shortly show an increase, as considerable planting of trees is in progress, and more care is being given to the preparation of the bean for the market.

Up to the present Hayti has not produced sugar sufficient for its own needs, although last year little was required beyond the home-grown crop. Some Haytian citizens are negotiating for an extensive track of sugar-cane land—about 3,000 acres—for the purpose of establishing an extensive sugar plant to manufacture white cut sugar, which till now has been imported from the United States.

### Agricultural Products of Zanzibar.

The British Vice-Consul, in his report on the Protectorate of Zanzibar, states that slightly improved prices were obtained for the cocoa-nuts shipped during 1906, in consequence of a demand for them which sprung up at Suez. Towards the end of the year, too, the price of copra reached a figure hitherto unknown. Competent authorities state that with a little more care and attention to present trees, and with fresh plantations, the output of the cocoa-nut could easily be doubled. In spite of these evidences of the possibility of establishing a good trade in this line, however, it is only in a very few places that the cocoa-nut palm is properly cultivated and cared for.

Vanilla is being experimented with, and last year gave a small crop, but there is every sign of good results in the near future.

Oranges are reported to grow both plentifully and well on both the islands, and are noted for their excellent quality. Orange planting is certainly an industry of promise in Zanzibar, as a very good market exists for this and other fresh fruit all along the coast stretching from Cape Town to Aden.





## INSECT NOTES.

### Scale Insects on Cotton.

In consequence of frequent complaints from cotton growers in Barbados as to the occurrence of black scale on their crops, the Imperial Department of Agriculture has issued a leaflet, giving in simple language, an account of the scale insects which attack the cotton plant, and directions as to the best methods of controlling these pests. Copies of the leaflet may be obtained free on application to the Imperial Commissioner of Agriculture, Barbados.

There are at least two kinds of scales—the white and the black—which infest the cotton plant, but up to the present the black scale has been much the more serious pest in Barbados. On one estate the plants in several fields had to be destroyed on account of attack, and no cotton was obtained from these fields. The black scale when young is greenish in colour, becoming dark-brown or black as it grows older.

The first appearance of scale insects on cotton plants is generally on the stem near the ground. As the first appearing insects mature, eggs are produced by them in considerable quantity, from which young insects hatch, and spread to all parts of the plant.

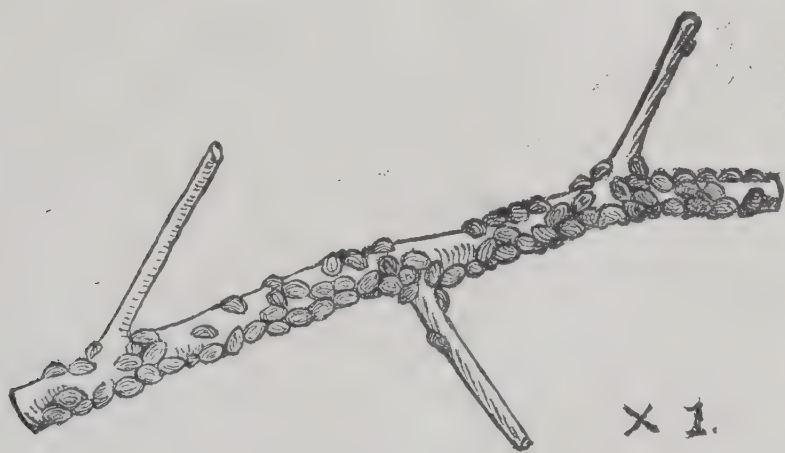


FIG. 22. SCALE INSECTS ON COTTON BRANCH.

Serious losses to the cotton grower as the result of black scale attack occur only if the plant becomes infested while quite young. In such a case the insects have the whole period of life of the cotton plant in which to grow and multiply.

A young and rapidly growing plant, too, is naturally more injured than a more mature plant by an insect pest which robs it of the food supply required for the building up of its tissues. The young plant is weakened, and as a result is more likely to die during the dry season. The amount of cotton yielded, too, is very much reduced.

In case of attack by scale insects, the cotton grower may either destroy the crop, and replant the field, or he may adopt methods for destroying the pest and save the cotton plants. It is pointed out in the leaflet above-mentioned that if the cotton is quite young—from four to six weeks old—

and badly infested, it will be better in most cases to clear the field and make a fresh start. On the other hand, if the cotton is two or three months old when the scales appear, it will probably be better to adopt measures for destroying the insects. If it were near the end of the season, and the plants had yielded one crop and gave promise of another, all badly infested plants, and infested branches of plants, should be removed and burned.

The method recommended for the destruction of the insects are: first, the removal and burning of badly infested plants as just mentioned, and after this the remaining plants may be sprayed with any of the mixtures containing rosin recommended by the Imperial Department of Agriculture, or they may be washed with a solution of whale oil soap.

### The Cotton Worm.

The technical accounts of the cotton worm begin in 1822, with a description of the species from a specimen of the moth from Bahia. The earliest recorded appearance of the cotton worm in the United States was in Georgia in 1793, after cotton had been cultivated for about 150 years. In the Mississippi valley, cotton had been grown about sixty years previous to the appearance of the cotton worm, in 1804.

There can be no doubt that the cotton worm is indigenous to South America and the West Indies. The fact that it was not known in these islands during the periods when cotton was not cultivated is not very remarkable; the small amount of cotton growing wild merely served to keep alive a few individuals from year to year. The really remarkable occurrence in this connexion was the wonderful increase of the number of this pest in 1903, the first year in which large areas of cotton were planted. Since that time the cotton worm has been a pest of first importance in all the British West Indies where cotton has been grown, except in St. Vincent, where it made its appearance for the first time in 1906.

### INCREASED PRICE FOR INDIGO.

The United States Consul at Rotterdam, in a recent review of the market conditions in relation to various articles of commerce, reports an advanced price for natural indigo. The Consul writes:—

After many years of disappointment, 1906 can point again to a strong rise in prices for Java indigo. This is the more remarkable as prices for the artificial product remained unchanged. In January, owing to the high prices at Calcutta for Bengal indigo, the Rotterdam supply of 705 cases on hand was soon sold at prices which had increased by from 4c. to 8c. As expected, the arrivals of the year's crop were limited, since the cultivation has decreased considerably, and many planters prefer to sell their crops on future delivery, but as most buyers only wish to buy on sample—which can be done by buying in the Dutch market—the demand continued, and for the finest quality product, as much as \$1.20 per  $\frac{1}{2}$  kilo. (1.1 lb.) was known to have been paid.

The indigo crop acreage in the East Indies, which has been yearly decreasing, has now come to a standstill. Although the managers of some plantations have deemed it best to stop the cultivation, others have again commenced to plant. At present thirty-five plantation enterprises produce indigo.



### THE GROUND NUT.

The ground nut or peanut (*Arachis hypogaea*)—a plant which deserves more attention in the West Indies than it at present receives—belongs to the natural order Leguminosae.

It shows some striking differences, however, as compared with peas, beans, and other well-known leguminous plants—more especially in the interesting formation of underground fruits. The pods of most of our common leguminous plants break open at maturity. This is not the case with the ground nut. After fertilization has been effected, the yellow petals of the blossom drop off, the flower-stalk elongates, and



FIG. 23. THE GROUND NUT.

as a result, the tip of the stalk, together with the remaining portions of the flower, is buried in the soil. If the stem fails to reach the ground no pod is formed, but once the tip of the stalk finds its way into the soil the pod develops rapidly. The ground nut is therefore an underground legume—hence its name *hypogaea* (under the earth). The formation of the underground fruits is shown in Fig. 23.

Grown as an economic crop the ground nut gives good

results without demanding the most fertile soils, or requiring expensive cultivation and manuring. It prefers a sandy loam, and the presence of a good porportion of lime is an advantage. Being a leguminous plant the ground nut is able to absorb nitrogen from the atmosphere, and so to enrich the soil in nitrogenous constituents. The plant has practically no insect enemies, a fact which of itself goes a great way towards ensuring a profitable return.

With a view to encouraging the cultivation of this useful and paying crop in these islands, the Imperial Department of Agriculture has published a pamphlet entitled 'Ground Nuts in the West Indies' (price 2*d.*, by post 2½*d.*) which gives full information as to methods of cultivation, etc.

### CAMPHOR CULTIVATION AND PRODUCTION.

The cultivation and production of camphor, though up to the present almost entirely confined to the island of Formosa, where the industry is practically a monopoly of the Government of Japan, have lately been receiving attention in other countries, notably Ceylon, Malaya, and the United States.

A good deal, too, has recently been heard of synthetic or artificial camphor, and Dr. Hempel of Leipzig, writing in the *Chemiker Zeitung*, states that it is being manufactured in large quantities at one factory in Germany. He points out, however, that its profitable production depends on a high price being maintained for camphor, as turpentine oil, from which the artificial product is made, is an expensive article. It is said that Japan is regulating the supply from the Formosan forests so as to keep up the price, and that she could at any time, without loss to herself, largely augment the output so as to lower prices, if the synthetic article became a serious competitor on the market. Such a step would make the commercial production of camphor from dear turpentine oil quite impossible.

Though there is a considerable demand for camphor in the manufacture of smokeless gun-powder and celluloid, yet as pointed out by the *Tropical Agriculturist*, if a country such as Ceylon were to plant 25,000 acres of camphor, it would meet the entire demand for this product. In view of the planting activity mentioned above, therefore, it is hardly likely that a great future lies in front of the camphor manufacturing industry.

The *Hawaiian Forester and Agriculturist* reprints a lengthy paper on 'The Camphor Industry,' which was read before the Farmers' Institute of Hawaii with the view of bringing the possibilities of camphor cultivation before Hawaiian planters. This paper gives detailed information as to sources of supply, present supply and demand, the history, properties, and uses of camphor, its cultivation, cost of planting, etc., methods of refining, and estimated yield that might be obtained.

It was calculated that the annual yield of camphor per acre should reach 750 lb., which, taking the present price of camphor (65*c.* per lb.), would give a gross return of \$375. Estimating the cost of planting, weeding, distillation and fuel at \$75, camphor cultivation would give a net return per acre of \$300. The most moderate estimate would put the net return that might be expected at \$150 per acre. The paper concludes by strongly advising Hawaiian planters possessing land not suited to rubber, tobacco, sisal, or citrus fruits, or holding more land than they care to put under the above crops, to experiment in camphor.





## GLEANINGS.

The value of the cotton exported from Egypt to the United Kingdom during 1906 reached the enormous figure of £13,278,000, as compared with £9,938,000 in 1902.

During the year 1906-7, the imports of St. Vincent reached a value of £78,008, and the exports £83,755. This is a considerable advance on the figures of late years.

The four West African rams imported from Lagos by the Imperial Department of Agriculture arrived in Barbados on September 26. They are fine, handsome animals, and appear to be in excellent condition.

A new cane sugar factory, to deal with 300 tons of sugar-cane per day, is about to be erected in Porto Rico. Messrs. Mirrlees, Watson & Co., Ltd., of Glasgow, have secured the contract.

The crops of maize obtained in Guatemala in 1905 and 1906 were exceptionally good, both as regards quantity and quality. The price ranged from 3s. to 4s. 6d. per 100 lb. Maize forms the principal food of the natives. (*British Consular Report.*)

The British Consul at Curaçoa reports that last year aloes were in good demand, and it is expected that the increased prices obtained will stimulate production. Last year's crop of divi-divi was an excellent one and commanded good prices throughout the year.

The *Jamaica Daily Telegraph* publishes a report from Reno, Nevada, to the effect that a syndicate has been formed for the purpose of establishing the cultivation of bananas in the country around the Reno goldfield. The idea of the new company is to adopt a plan which has promised well in various experiments carried out in the United States, and to graft the banana upon the so-called Joshua tree, a species of cactus which abounds in the vicinity.

M. Chevalier who recently undertook a botanical expedition into the interior of the Ivory Coast Colony, at the request of the French Government, reports the existence of at least 250 different varieties of trees. This speaks well for future developments of the timber industry. At present only mahogany is exported. M. Chevalier also found abundance of rubber plants, as well as kola trees, and a new species of coffee plant, *Coffea humilis*.

Under new regulations issued by the provisional Governor of Cuba, all female sheep, and cattle under six years of age belonging to the Shorthorn, Hereford, Aberdeen-Angus, Red-Poll, Galloway, Devon, Jersey, Guernsey, Ayrshire, Zebu, Mysore or Brahmin breeds, imported for breeding purposes, and all cattle under six years old, imported from Porto Rico or the Argentine Republic for this purpose, shall be admitted into the island duty free.

The amount of cacao exported from Trinidad, from the beginning of the present year up to date, shows an increase of about 4½ million pounds as compared with the shipments of the corresponding period last year, although it is nearly 3½ million pounds short of the exports for the same period of 1905. The actual figures for the periods in question are 26,992,260 lb. (1907), 21,465,390 lb. (1906), and 30,370,415 (1905).

In connexion with the use of Paris green for the destruction of the cotton worm, the proportion of the mixture recommended by the Imperial Department of Agriculture is 1 lb. of Paris green to 6 lb. of lime, and not 1 lb. of the green to 5 lb. of lime, as was stated (in consequence of a misprint) in the last issue of the *Agricultural News* (Vol. VI, p. 290).

With a view to encouraging and facilitating the importation of breeding stock, the Government of Brazil has announced that they will not only remit customs duties, but also pay the cost of transport from the exporting country, on sound and healthy breeding animals—horses, cattle, sheep, goats, swine, poultry, etc., imported into Brazil by agriculturists and cattle breeders. This, however, does not apply to animals, imported from a country where contagious diseases are prevalent.

The high prices of cacao on the London market (latest quotation 115s. per cwt.) is attributed in some quarters to the operations of a ring of speculators. This is denied in Mincing Lane, where the dealers assert that the advanced price is explained by increased consumption. Gradually increasing consumption, however, would hardly justify a sudden rise of 17s. per cwt. and a second rise of another 10s. a fortnight later.

The *St. Vincent Times* reports a serious attack of cotton worm on the estate of Mr. Smith of Argyle, and 8 acres of cotton are said to have been destroyed. Growers in the neighbourhood should be careful to dust their crops with Paris green and lime as recommended by the Imperial Department of Agriculture, and so prevent the attack from spreading.

The St. George's Agricultural Society, Jamaica, is reported as doing excellent work in encouraging the better cultivation of cacao among the smaller cultivators of the neighbourhood. The district is eminently suited for the cultivation of this product. The Society is offering prizes of different values for the best samples of cacao produced, the points taken into consideration in awarding the prizes being general appearance, drainage, tillage, pruning, manuring and tidiness. (*Jamaica Daily Telegraph.*)



## SCIENCE NOTES.

### Metamorphic Rocks of Trinidad.

A report on the metamorphic rocks of the Northern Range of Trinidad has been issued by Mr. E. H. Cunningham-Craig, the Government Geologist, who, during the past three and a half years, has been engaged in conducting a geological survey of the islands of Trinidad and Tobago.

Metamorphic rocks are those which at some time since their original deposition have been subject to the influence of heat, chemical action, or great pressure, as a consequence of which their internal structure and outward appearance no longer resemble those of the original rocks. Thermo-metamorphism is the name given to the changes brought about in rocks by the action of heat, while when pressure is the active agency, the changes produced are known as dynamo-metamorphism.

In the Northern Range of Trinidad we have an example of dynamo-metamorphism, where the rocks have undergone intense folding in consequence of the operation of great horizontal earth movements acting in a north-north-west and south-south-east direction. The result of this repeated folding has been the formation of what is known as a 'fan-structure,' in which the folds dip vertically at the centre, but at gradually decreasing angles on either side. The 'shearing' process (or slight movement of thin layers of rock upon each other) which accompanied the folding has also had considerable influence in altering the character of the original strata.

Fifty years ago Messrs. Wall and Sawkins made a preliminary survey of the geology of Trinidad, and they estimated the thickness of the strata forming the Northern Range as being from 10,000 to 12,000 feet. Mr. Cunningham-Craig, however, states that in this they were misled by the constant repetition of beds due to folding, and that the actual thickness of strata is no more than 1,000 to 2,000 feet.

Limestone appears to be the oldest among the group of sediments represented, and with the limestone are associated fine silvery mica schists and talc-mica schists with occasional graphitic bands. These latter beds were originally shales. Above the graphite schists comes a group of coarse siliceous grits, which have been little affected by shearing movements. Other groups may be present, but to enable the complete succession to be described, detailed mapping over a wide area would be necessary.

With regard to the age of these metamorphic rocks, little is at present known, but such evidence as is available suggests the possibility that the rocks belong to the Mesozoic age, and are formed of strata not older than the Jurassic. The fossils that have so far been discovered are few in number, as well as being ill-preserved and incomplete. Future workers will no doubt bring to light additional information that will definitely fix the age of the strata, and Mr. Cunningham-Craig recommends the Toco district as a favourable field in which to search for fossil evidences.

With regard to the economic minerals existing in the Northern Range, traces of gold occur in several parts, but it is not yet known whether or not it is present in quantities that will pay to work.

Iron ore in the form of haematite and magnetite are also found in parts, but nowhere in sufficient quantity to make it worth working. The graphite of the graphite-schists, too, is of little economic value.

The limestone present is very pure in quality. At

present it is largely quarried for road metal, but it might be utilized in the manufacture of Portland cement. Red clay, for claying cacao, is another useful substance that is worked in more than one part of the range, notably in the Santa Cruz valley.

### TOBACCO CULTIVATION IN CEYLON.

A short article in the *Tropical Agriculturist* for July gives particulars of the method of cultivating and curing tobacco in the Chilaw district, on the east coast of Ceylon, a district that is noted for the good tobacco produced there.

Planting is carried out in December, and the kind of soil preferred is a sandy loam, which is hand-manured, or enriched by penning cattle on it some months in advance. The seed is sown in long, narrow nursery beds which have been well dug and worked to a fine tilth. Previous to sowing, the seed is soaked in water for about forty-eight hours, this water being changed every six hours. The seeds are sown fairly thickly, and the bed is then covered with branches. Light lean-to sheds, about 3 or 4 feet high, of the same material are run up over the beds when the seeds begin to germinate, which takes place about the third day. The seedlings are watered once a day, and all plants likely to grow into weaklings are pulled up and thrown away.

Meanwhile the permanent beds are prepared for the young tobacco seedlings, which are transplanted when they are from 4 to 6 inches high. For this purpose holes are made about 4 feet apart, and manured; and in these the young plants are set. Care is taken to water the plants well in dry weather.

The after cultivation consists of forking and top-dressing, which takes place twice; the first occasion being about twelve days after transplanting, and then again about fifteen days after.

A third and final forking, which appears to be regarded as a very important operation, and which is done rather deeply so as slightly to bruise the roots and wither the leaves, is carried out at the end of the next fifteen days.

When the plants have reached a little more than 4 feet in height, all, with the exception of a few reserved for seed purposes, are topped at a height of about 4 feet from the ground, and all the side shoots are then pinched off every off and the stem of the plant is cut back to the fourth leaf, ten or twelve days for three or four weeks.

Experience indicates when the first three leaves of the plant are in the best condition for gathering. They are cut. These first leaves make the best tobacco.

Four or five days later, the next three leaves are usually ready for gathering, and these go to make second qualities of tobacco.

Still later, another three leaves are gathered, and finally the whole plant is taken up, the final gathering, however, yielding tobacco of very poor quality. In grading the leaves after their preparation they are all sorted out, and put into classes irrespective of the batch to which they originally belonged.

In curing the tobacco, the leaves—which were cut the previous afternoon and kept in a shed over-night—are next morning spread in the sun, underside up, for a short time, care being taken that the leaf does not get scorched. The upper sides are exposed in the same way on the two following days. The leaves are folded after this, and only the midribs exposed to the sun until they are thoroughly cured, which takes place in eight to twelve days' time. The tobacco is then sorted out into different grades, stored, and finally disposed of to the traders.



## FUNGUS DISEASES OF PLANTS IN TRINIDAD.

In the *Annual Report* of the Botanical Department, Trinidad, for the year ended March 31, 1907, the Superintendent, Mr. J. H. Hart, F.L.S., refers briefly to several of the fungi that affect plants in that colony.

Considerable work has been done in the examination of fungi found upon cocoa-nut, cacao, orange, Castilleja, etc. On the cocoa-nut, a fungus known as *Pestalotzia palmarum*, and another, provisionally termed *Diplodia*, were found. This latter has since been referred to as *Botryodiplodia* in the report on cocoa-nut diseases of the Mycologist of the Imperial Department of Agriculture. On cacao a fungus has been found, which the same authority refers to as *Lasioidiplodia*.

The examination of the wood of an orange tree, supposed to have died from 'root-rot' or mal-di-gomma, also showed the same kind of spores as have been found in the cocoa-nut and cacao, and still later a specimen of a diseased Castilleja showed spores of a similar character, and lastly the fruit of *Clusia* sp. (*Scotch Attorney*) has been observed completely covered with a like fungus. . . . .

Several 'thread fungi' have also been examined. These have been brought in from districts wide apart. This class of fungi is to be considered as distinctly dangerous to cacao and other crops. They are, however, as yet undetermined, and await further investigation.

In reference to diseases affecting cacao, Mr. Hart draws attention to the incompleteness of our knowledge of the fungus *Lasioidiplodia* sp., which has recently caused some damage in several plantations, and the only recommendation that can at present be made is 'to cut out and burn' all affected parts. Attention is also directed to the prevalence of 'canker.' This disease is thought to be the greatest enemy of the cacao planter, and every effort should be made to encourage modern sanitary methods of agricultural practice on the cacao plantations.

## FUNGUS DISEASES OF PLANTS IN CEYLON.

As some of the information about fungus diseases of plants in Ceylon is likely to be of interest to planters in the West Indies, the following short abstract has been taken from the report for the year 1906, of Mr. T. Petch, B.A., B.Sc., the Government Mycologist:—

Three cases of diseases of cacao caused by *Diplodia cacaoicola*, P. Heun., were examined during the year. In two instances the branches died back from the tips, but the third was sent in as a new form of 'canker.' *Diplodia cacaoicola* is a fungus that is well known in the West Indies, where it is chiefly regarded as a wound parasite, being responsible for 'brown pod' and 'die-back.'

The treatment of 'canker' of cacao continues to be effectual, but scientific knowledge concerning the disease leaves much unexplained. The position in Ceylon would indicate that: (1) a disease attacking the pod may work through the peduncle into the stem; (2) the stem may become diseased quite independently of any pod diseases.

During tours in the low-country, a leaf disease of cocoa-nuts due to *Pestalotzia palmarum*, Cke., was seen to be very common, but is not regarded as serious, for it is common on most of the palms in Ceylon. A 'bud-rot' disease appeared

on a small native estate early in the year when young trees were affected. These were all cut out and destroyed, and the disease has apparently spread no further. A stem disease, characterized by a flow from minute cracks in the stem of a liquid that forms misty brown or black patches on the exterior, also received attention. In many cases, especially on old trees, it causes merely a local injury, but on younger trees it may reduce the whole of the interior of the tree to a brown mass of humus.

Para rubber (*Hevea brasiliensis*) has received considerable attention, and investigations have been made into several diseases affecting this plant. A root disease, due to *Fomes semitostus*, Berk., has been shown to have originated on the jungle stumps left on the estates. Where the disease occurs in plantations, the jungle stumps must be removed, and probably an alteration in the method of clearing, which would avoid leaving these large stumps, could be devised. This would effectually prevent the attacks of this fungus.

'Die-back,' probably caused by *Gloeosporium alborubrum*, Petch, continues to kill off trees about a year old. The stem usually near the top turns brown and ultimately dries up, and should be cut off and buried in order to prevent total destruction of the plants.

In several instances young plants failed to grow after being planted out. In all cases *Botryodiplodia elastica*, Petch, was found to have attacked the plant at the collar. It probably enters the stem through injuries made during planting.

Castilleja is attacked by a 'root-rot' similar to that familiar on orange trees, and, like that disease, is apparently caused by a species of *Fusarium*. The fungus appears through small cracks in the apparently sound bark in the form of white tufts, which at first sight may be mistaken for drops of coagulated latex. Good drainage is essential, in order to avoid the spread of this disease.

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## AGRICULTURE IN LIBERIA.

The West African Republic of Liberia has considerable natural resources, but its agricultural possibilities appear to have undergone little development up to the present. The particulars given below are taken from the last *Annual Report* of the United States Consul at Monrovia:—

Liberia is an agricultural country. Its possibilities are incalculable; yet no organized effort has been made to stimulate the productive energies of the country by official effort until 1906. Under the guidance of the Commissioner of Agriculture much of the year was spent in organizing the country into agricultural societies. The President in his annual message to the Legislature of 1907, urged the stimulation of the producing classes by the establishment of agricultural and industrial fairs on the co-operative plan, and he promised that the Government would aid in a substantial way.

The principal articles of export continue to be coffee, piassava fibre, palm kernel, palm oil, ginger, ivory, hides, and timber. Coffee has risen slightly in price, and there is great demand for African ginger. Liberia needs modern methods in the preparation of the coffee berry for foreign markets, as well as its cultivation on a more extensive scale. Considerable trade is being developed in Calabar beans, cacao, and rubber. The total exports of Liberia for the year 1906 were of the value of \$777,507. Coffee continues to be the chief export to the United States.



## PROSPERITY OF DOMINICA.

The August number of *Britannia* comments upon the improved condition of affairs in the island of Dominica, as compared with that of ten years ago, when the failure of the sugar industry was being severely felt, and the inhabitants of the island were draining off to the gold mines of Cayenne and Venezuela.

To quote from the article referred to:—

With the disappearance of the sugar industry, and with the agricultural possibilities in other directions being taken advantage of, a new era has set in. Cacao, coffee, fruit, and the citrate of lime industry are the enterprises now engaging attention, and these crops are proving the basis of a more secure industrial and financial situation in the colony. The lesson of this is not being lost in the Caribbean, and the argument of forcing on alternative agricultural industries to take the place of the unreliable cane crop is constantly being urged.

In reference to the production of citrate of lime, the writer of the article says:—

This industry had its inception on Bath estate, and the citrate manufactured gave such satisfactory and promising results that the export of the present year is expected to show a considerable increase on that of 1906, and it is anticipated that in the near future the manufacture of citrate of lime will rank among the more important industries of the colony. Exported in the form of citrate of lime, the product has been found to pay better than when shipped as concentrated juice. The Dominicans seem to have caught the flood-tide, for lime products have recently reached a higher figure than that secured for many years.

## COCOA-NUTS AND CACAO IN QUEENSLAND.

Sugar is one of the most important crops grown in the north of Queensland, and the area devoted to its cultivation is gradually being extended. It is pointed out in the *Queensland Agricultural Journal* that if this continues, the time will come when a market will have to be found for the surplus sugar produced, although Queensland cannot hope to compete as a sugar-exporting country with colonies having a cheaper labour supply. In view of this the *Queensland Journal* advocates that the area devoted to the sugar production should be limited, and that attention should be given to new objects of cultivation, such as cocoa-nuts and cacao, quoting at the same time the following experiences of a planter with these products:—

I had eight years' practical experience of tropical agriculture in Samoa among cacao, cocoa-nuts, coffee, rubber, and vanilla, and I have come to the conclusion that of these the cultivation of cocoa-nuts and cacao are the only suitable pursuits for the agriculturist in North Queensland. The cultivation of cotton, coffee, rubber, sisal hemp, and sugar-cane depend mostly for their existence upon a continual supply of cheap, reliable labour, and in this respect, neither Queensland nor any other part of Australia can compete with the rest of the world.

Cultivation of cacao and cocoa-nuts depend only on the situation of the land, and the conditions of the soil and

climate, and in my opinion, could be grown both successfully and profitably on the coast lands of North Queensland, even under existing labour conditions. Cocoa-nut trees are growing in many parts of this district, but the growers have not sufficient of them to justify their going in for the preparation and exportation of copra.

Cocoa-nut trees will grow and bear successfully only a certain distance from the sea-coast, and in loose limy soil, sandy, or mudbank, and only directly within the very tropics. Cocoa-nut trees like to have their roots in the ground-water and their crown in the sea wind. These conditions of soil are not too plentiful, but in the north of Queensland there are surely 100,000 acres of coastal land suitable for the cultivation of cocoa-nut trees, which, when planted, and the trees in bearing, will bring in more revenue and have a greater commercial value than the product of all the South Sea Islands combined.

One industrious worker can make 2 to 3 cwt. of dried copra in one day, and the price for first-class copra was recently up to £26 and £27 per ton in the London and Marseilles market. Copra contains 50 to 70 per cent. of oil, which is nearly all used in the manufacture of soap. Cocoa-nut oil contains 50 per cent. less moisture than tallow, and, on that account obtains 50 per cent. better price than the latter product. The world's demand for soap is rapidly increasing year by year, and the supply of tallow and other fats does not increase, so that there should be no fear entertained as to a fall in the price of copra.

The returns of a cocoa-nut plantation vary a great deal according to the situation, but in Samoa, Tonga, and other islands the official average of the annual gross return of a cocoa-nut tree is 4s., and the value of a tree is considered to be about £1 12s. Cocoa-nut trees begin to yield when about eight years old, but full crops cannot be expected till the tree is from twelve to fifteen years old.

The cultivation of cacao (*Theobroma cacao*) is the most payable of all tropical industries, wherever it grows and bears successfully. The dry cacao beans contain 14 per cent. of nitrogenous substance, and, on this account the cacao tree requires the very richest of soils, such as that afforded by the banks of rivers in alluvial valleys, and at the foot of mountain ranges. Cacao wants, a damp hot climate, with a temperature never below 60°, and protection from wind and the direct rays of the sun.

The cacao tree has a great number of enemies: rats and birds attack the fruit, while ants, borers, and grubs attack the roots and wood. Fungoid diseases such as 'canker' are sometimes the cause of enormous destruction, as planters in Ceylon and in Trinidad can testify. The heavy tropical rain, too, is often a serious drawback to cacao cultivation, as it washes away the nitrogen substance from the soil during the first four or six years when the cacao trees bear, and then a full-bearing cacao plantation takes more nitrogen out of the soil than most other crops. Cacao growing is by no means so easy as growing cocoa-nuts or orange trees. Good practical experience is required at the start, but were not that the case, other countries would have long ago swamped the world's market. The return of a good bearing cacao plantation is from 5 to 7 cwt. of cacao to the acre.

The price obtained varies from £60 to £110 per ton. Twelve to eighteen pods give 1 lb. of dry cacao beans. I have seen as many as 300 cacao pods on one tree at one time. One man can easily look after 10 acres of land planted with cacao trees, doing all the weeding, harvesting, and pruning required.



## MARKET REPORTS.

**London**,—September 17, 1907. 'THE WEST INDIA COMMITTEE CIRCULAR,' Messrs. KEARTON, PIPER & Co.; September 6, Messrs. E. A. DE PASS & Co.; 'THE LIVERPOOL COTTON ASSOCIATION WEEKLY CIRCULAR,' September 13, 1907.

**ARROWROOT**—St. Vincent,  $2\frac{1}{4}d.$  to  $2\frac{3}{4}d.$  per lb.  
**BALATA**—Sheet,  $2/3$  to  $2/7$ ; block,  $1/10$  to  $1/10\frac{1}{2}$  per lb.  
**BEES' WAX**—£7 7s. 6d to £7 10s. per cwt.  
**CACAO**—Trinidad, 84/6 to 112/- per cwt.; Grenada, 106/- to 114/-; Dominica, 106/6 to 110/-; Jamaica, 106/- to 109/6; Demerara, 104/- to 112/- per cwt.  
**CHILLIES**—Japanese; fair large red and yellowish, 19/- to 20/-; Zanzibar and Mombasa mixed, 17/6 to 20/-; Sierra Leone, 28/6 per cwt.  
**COFFEE**—Jamaica, 40/- to 63/6; Santos, 30/7½d. per cwt.  
**COPRA**—West Indian, £22 per ton.  
**COTTON**—Barbados, 22d.; Nevis, 17¼d.; St. Croix, 17d. to 18d.  
**FRUIT**—  
**BANANAS**—Jamaica, 4/- to 5/- per bunch.  
**PINE APPLES**—St. Michael, 2/6 to 4/6 each.  
**GRAPE FRUIT**, 16/6 to 24/- per box.  
**ORANGES**—Jamaica, 13/6 to 16/- per box.  
**FUSTIC**—£4 5s. to £4 15s. per ton.  
**GINGER**—no quotations.  
**HONEY**—22s. to 27s. per cwt. for dark liquid to yellowish.  
**ISINGLASS**—West India lump, 1/6 to 2/- per lb.; cake, 1/3.  
**LIME JUICE**—Raw, 1/2 to 1/6 per gallon; concentrated, £24 5s. per cask of 108 gallons; Distilled Oil, 3s. 1d. per gallon; hand pressed, 4/6 to 4/9 per gallon.  
**LOGWOOD**—£4 5s. to £4 15s.; Roots, £3 5s. to £4 5s. per ton.  
**MACE**—Fair to good pale, 1/1 to 1/4; fair pale and reddish, 1/- to 1/1; fair red, 11d. to 1/-; broken, 8½d. to 10½d.  
**NUTMEGS**—63's to 64's, 1/2 to 1/4; 67's to 70's, 9d. to 9½d.; 73's to 74's, 7½d. to 9d.; 78's to 86's, 7d. to 8d.; 87's to 91's, 5¼d. to 6½d.; 92's to 98's, 5d. to 6d.; 100's to 111's, 4½d. to 5½d.; 112's to 117's, 4¼d. to 4¾d.; 118's to 124's, 4d. to 4½d.; 125's to 142's, 3½d. to 4½d.; 146's to 157's, 3¼d. to 3¾d.  
**PIMENTO**—Fair, 3½d. per lb.  
**RUBBER**—Fine hard Para, 4/5¼d. to 4s 6½d.; soft fine, 4/5¼d. to 4s. 5½d. per lb.  
**RUM**—Jamaica, common, 2/7 to 2/10; good, 3/- to 8/-; Demerara, 1/0½ to 1/2½ per proof gallon.  
**SUGAR**—Crystals, 17/6 to 19/-; Muscovado, 11/6 to 14/6; Molasses, 11/6 to 12/-.

**Montreal**,—August 9, 1907.—Mr. J. RUSSELL MURRAY.  
(In bond quotations, c. & f.)

**COCOA-NUTS**—Jamaica, \$32.00; Trinidad, \$29.00 per M.  
**COFFEE**—Jamaica, medium, 10c. to 12c. per lb.  
**GINGER**—Jamaica, unbleached, 15c. to 16c. per lb.  
**MOLASSES**—Antigua, 19c.; Barbados, 22c. to 23c. per Imperial gallon.  
**NUTMEGS**—Grenada, 16c. to 17c. per lb.  
**PIMENTO**—Jamaica, 6c. to 6½c. per lb.  
**SUGAR**—Grey crystals, 96°, \$2.50 per 100 lb.  
—Muscovados, 89°, \$2.06 per 100 lb.  
—Molasses, 89°, \$1.80 per 100 lb.

**New York**,—September 6, 1907.—Messrs. GILLESPIE BROS. & Co.

**CACAO**—Caracas, 20c. to 26c.; Grenada, 24c.; Trinidad, 22½c. to 23c.; Jamaica, 21½c. to 22½c. per lb.  
**COCOA-NUTS**—Jamaica, select, \$31.00 to \$33.00; culls, \$20.00 to \$21.00; Trinidad, \$30.00 to \$32.00; culls, \$19.00 to \$20.00 per M.  
**COFFEE**—Jamaica ordinary, 7¼c.; good ordinary, 8c.; good

washed, 11c. to 11½c. per lb.  
**GINGER**—Small to bold scraggy root, 15c. to 15½c.; small to bright bold, 15½c. to 16½c. per lb.  
**GOAT SKINS**—Jamaica, 50c.; St. Kitt's, St. Thomas, and St. Croix, dry flint, 42c. to 48c.  
**GRAPE FRUIT**—Jamaicas, \$5.50 to \$7.10 per barrel.  
**LIMES**—\$4.50 to \$5.00 per barrel.  
**MACE**—no quotations.  
**NUTMEGS**—110's, 12c. per lb.  
**ORANGES**—Jamaica, \$5.00 to \$5.50 per barrel.  
**PIMENTO**—6¼c. to 6½c. per lb.  
**SUGAR**—Centrifugals, 96°, 3.92c. to 3.95c.; Muscovados, 89°, 3.42c. Molasses, 89°, 3.06c. per lb., duty paid.

### INTER-COLONIAL MARKETS.

**Barbados**,—Messrs. JAMES A. LYNCH & Co., October 1.

**ARROWROOT**—St. Vincent, \$4.75 per 100 lb.  
**CACAO**—Dominica, \$20.00 per 100 lb.  
**COCOA-NUTS**—\$22.80 per M. for husked nuts.  
**COFFEE**—\$9.00 to \$9.50 per 100 lb.  
**HAY**—\$1.60 per 100 lb.  
**MANURES**—Nitrate of soda, \$62.00; Ohlendorf's dissolved guano, \$55.00; Cotton manure, \$42.00; Cacao manure, \$42.00; Sulphate of ammonia, \$72.00; Sulphate of potash, \$67.00 per ton.  
**MOLASSES**—no quotations.  
**ONIONS**—Madeira, \$2.00 per 100 lb.  
**POTATOS, ENGLISH**—\$1.30 to \$1.40 per 160 lb.  
**PEAS**—Split, \$5.90; Canada, \$3.15 per bag.  
**RICE**—Demerara, \$5.50 (177 to 180 lb.); Patna, \$3.65 to \$4.00; Rangoon, \$3.00 to \$3.10 per 100 lb.  
**SUGAR**—Yellow crystals, \$3.75 per 100 lb.

**British Guiana**,—September 21, 1907.—Messrs. WIETING & RICHTER.

**ARROWROOT**—St. Vincent, \$10.00 to \$12.00 per barrel.  
**BALATA**—Venezuela block, 32c.; Demerara sheet, 48c. per lb.  
**CACAO**—Native, 16c. to 17c. per lb.  
**CASSAVA**—No stock.  
**CASSAVA STARCH**—\$9.00 per barrel.  
**COCOA-NUTS**—\$12.00 to \$16.00 per M.  
**COFFEE**—Creole, 13c. to 14c.; Jamaica, 12c. per lb.  
**DHAL**—\$5.15 to \$5.40 per bag of 168 lb.  
**EDDOS**—\$1.00 to \$1.44 per barrel.  
**MOLASSES**—18c. to 19c. per gallon.  
**ONIONS**—Madeira, 1¼c. to 2½c. per lb.  
**PLANTAINS**—20c. to 48c. per bunch.  
**POTATOS**,—Madeira, 1c. per lb.  
**POTATOS, SWEET**—Barbados, \$2.16 per bag.  
**RICE**—Creole, \$5.00 to \$5.25 per bag; Seeta, \$6.00 per bag.  
**SPLIT PEAS**—\$6.40 per bag (210 lb.).  
**TANNIAS**—\$2.16 to \$2.40 per bag.  
**YAMS**—White, \$3.24; Buck, \$3.00 to \$3.60 per bag.  
**SUGAR**—Dark crystals, \$2.25 to \$2.55; Yellow, \$2.90 to \$3.10; White, \$3.60 to \$4.00; Molasses, \$1.80 to \$1.90 per 100 lb. (retail).  
**TIMBER**—Greenheart, 32c. to 55c. per cubic foot.  
**WALLABA SHINGLES**—\$3.50 to \$5.50 per M.

**Trinidad**,—September 21, 1907.—Messrs. GORDON, GRANT & Co.

**CACAO**—\$26.25 to \$27.00 per bag; Venezuelan, \$26.00 to \$26.50 per fanega.  
**COCOA-NUTS**—\$21.00 to \$22.00 per M., f.o.b.  
**COCOA-NUT OIL**—\$1.05 per Imperial gallon (cask included).  
**COFFEE**—Venezuelan, 6½c. to 7c. per lb.  
**COPRA**—\$3.75 per 100 lb.  
**DHAL**—\$4.40 to \$4.60 per 2-bushel bag.  
**ONIONS**—\$1.25 to \$1.50 per 100 lb. (retail).  
**POTATOS, ENGLISH**—\$1.00 to \$1.10 per 100 lb.  
**RICE**—Yellow, \$5.60 to \$5.75; White, \$5.50 to \$6.65 per bag.  
**SPLIT PEAS**—\$5.50 to \$5.75 per bag.  
**SUGAR**—Grocery grades, \$5.00 to \$5.25 per 100 lb.





A FORTNIGHTLY REVIEW  
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Treatment of Fungus Diseases.

IN previous numbers of the *Agricultural News*, and in other publications of the Imperial Department of Agriculture, the attention of planters in the West Indies has repeatedly been drawn to the principal fungus diseases that affect their crops. It is here proposed to give a brief account of the methods that are commonly adopted for the prevention of the occurrence and spread of fungus parasites.

Improved methods of investigation have resulted in a vastly increased knowledge of the nature and causes of disease; and there has also been a corresponding advance in the treatments adopted for its prevention. In the control of many fungus parasites remarkable success has been obtained. Some of the methods have received a wide application, and should by this time have secured the confidence of the planter.

The chief points to be continually kept in mind when discussing the general treatment of fungus diseases may be classed under six heads:—(1) care in cultural operations and in the destruction of all diseased plant tissues; (2) spraying and soaking in disinfectants for destruction of parasites; (3) rotation of crops; (4) raising and propagating disease-resistant varieties; (5) avoiding the introduction of new plants from disease-affected localities; (6) use of good, healthy seed.

(1) Probably the most common source of plant infection arises through not promptly destroying all portions of plants that have become diseased. Such serve as centres of infection, and if they are allowed to remain, the fungi produce large quantities of spores that may infect healthy areas. The best method for the destruction of such diseased material is, of course, by burning; and this should be adopted whenever possible. Those plants or portions of plants that will not satisfactorily burn should be buried with lime—on no account should they be left lying about. It has always been recommended that all diseased cacao pods, as well as the husks or shells of healthy pods, should be buried, and it has further been advised that all dead fruits from the cacao tree, whether diseased or not, should be systematically collected, and included in the general



burial (*Agricultural News*, Vol. VI, p. 174). Where such methods have been adopted, considerable prevention of 'pod diseases' has undoubtedly resulted.

Investigation into the diseases affecting the cocoa-nut palm in Trinidad has also emphasized the necessity of keeping plantations as free as possible from dead or diseased trees, and it would appear that where careful sanitary methods have been adopted, the spread of the diseases has been considerably checked.

Many other diseases might be instanced under this heading, but it is only necessary to direct the attention of planters to 'canker', 'die-back,' and 'thread' diseases of cacao; 'anthracnose' of cotton; and 'root' disease of sugar-cane, as instances of diseases that can be controlled with fair success by care in cultural operations.

Canker of cacao is caused by a wound parasite, and makes itself the more noticeable on such estates where pruning is not carefully carried out. As much 'canker,' 'die-back,' and 'thread blight' as possible should be cut out during pruning operations, and portions of estates that are at all badly affected should receive special attention. 'Anthracnose' of cotton may be induced somewhat by too close planting, whereas the 'root' disease of sugar-cane can be prevented, to a certain extent, by care in cultivation, and in the treatment of cane cuttings as recommended by the Imperial Department of Agriculture.

(2) For the destruction of fungus parasites without injuring the host-plant, the disinfection of cotton seed in corrosive sublimate may be taken as an example. Spores of 'anthracnose' have frequently been observed in the lint that remains attached to the seeds after ginning. These, if allowed to remain, might cause loss amongst cotton in the seedling stage, but as recommended by the Imperial Department of Agriculture, they can be efficiently destroyed without damaging the germinating power of the seed, by soaking in a one-part-per-thousand solution of corrosive sublimate for twenty minutes. It might also be suggested that similar disinfection might be successfully adopted in respect to other seeds of economic value, at the time they are being shipped from one country to another.

For the destruction of superficial vegetative portions of parasites or their reproductive spores, spraying with fungicides is of value. This, however, should rather be used as a preventive. The spread of much of the disease to be found in cacao estates might probably be prevented if spraying with fungicides—such as Bordeaux mixture—were adopted as an estate duty.

(3) Rotation of crops is to be recommended for the purpose of checking disease, especially when the disease is present in the form of mycelium or resting spores in the soil. The fungus that causes a root disease may frequently be successfully starved out by a rotation of crops.

With permanent crops such as cacao, rotation cannot be practised; but in such cases root disease may be prevented from spreading if the infested area is isolated by digging trenches. The disease is thereby confined in extent. Such areas should be cleared, the affected trees dug up and destroyed, and the soil treated with quantities of lime in order to kill out some, if not all, of the mycelium of the fungus. After the ground has been allowed to rest for some time, and has been carefully cultivated, fresh supplies may be planted, with little fear of their being attacked.

(4) The raising of disease-resisting varieties of plants has recently become recognized as a matter of considerable importance. Many of the seedling sugar-canes that have been raised by this department are capable of withstanding certain fungoid diseases much better than the older varieties, and the wilt disease of cotton and cowpea has been successfully overcome in the United States by selecting immune varieties.

Workers in the breeding of improved varieties have long been endeavouring to obtain definite information in respect to disease resistance, and it would now appear that evidence has been obtained by the experimentalists at Cambridge University, which should make it possible to breed, with certainty, varieties of cereals immune to certain diseases. Experiments have this year been laid out in Barbados in respect to the breeding of sugar-canes, with the view of ascertaining whether similar methods may be adopted for the production of disease-resistant varieties of sugar-cane.

(5) Plants from disease-affected localities should be as far as possible, avoided for planting purposes, as it has often resulted in the introduction of new fungoid diseases. Most of the West India Islands now have laws preventing the importation of plants from countries known to be affected by disease, and most plants are disinfected at the port of entry.

(6) Good seed for planting purposes should always be chosen, and it need only be mentioned that much disease of sugar-cane has in the past been due to the choice of bad plants, to impress upon planter the necessity of using only carefully chosen seed.



## MAIZE EXPERIMENTS IN VIRGINIA.

The Director of the Virginia Experiment Station contributed to the *Southern Planter* for May last, an interesting and illustrated summary of the results of various experiments with maize that have been conducted at the station. The work done includes trials of different varieties of corn, manurial tests, and also experiments in crossing native varieties of maize with imported varieties. Many of the conclusions arrived at bear only upon the conditions which obtain in Virginia, but as others are worthy of more general consideration, the following short résumé is given:—

Twenty varieties of maize were under observation in these experiments, and the best yields so far have been obtained from Boone County White (78.57 bushels), Cocke's Prolific (77.68 bushels), Snow-White Dent (75.89 bushels), and Virginia Station Leaming, Ear No. 37 (75.89 bushels). A variety, Hickory King, is mentioned as one of the very best for soils of medium fertility.

The results obtained indicate that different strains of any given variety of corn vary considerably in their reproductive power, and the strain selected therefore has an important bearing on the yield obtained. In one case there was a difference of no less than 18 bushels per acre between the best and worst strains of the variety under test.

Observation shows also that seed from corn grown on thin soils does not at first give good results on rich soils. On the other hand, seed brought from fertile land in the West, and sown on good well-manured soils, gave excellent results.

Manuring tests with corn showed clearly that the growing and ploughing in of green leguminous crops (peas, beans, etc.), is a highly beneficial practice, and that where this is followed only moderate amounts of fertilizer will be required in order to produce increased yields. When vegetative matter is lacking, however, heavy applications of fertilizer seem advisable. On soils that required mineral manures in addition to the green crop ploughed in,  $1\frac{1}{2}$  to 2 cwt. of superphosphate, and about  $\frac{1}{2}$  cwt. of muriate of potash per acre gave the best results.

Trials were also made with a view to ascertaining whether the saving of energy effected by 'detasselling' or removing the male flowers from some of the plants, at an early stage, would result in increased yield, but very little difference was noticed, the extra amount of corn obtained not being even sufficient to pay for the labour of detasselling.

In the observations carried out, the period of 'silking,' i.e., the display of stigmas from the female flowers, was not completed till twelve days after 'tasselling' was over. The writer of the report would attribute to this fact the occurrence of 'barren' maize stalks, the female flowers of which probably developed late, when no pollen was available for fertilization.

Very satisfactory results were obtained from the plant-crossing, or cross-pollination experiments, which have so far been carried out at the Virginia Station, maize being a plant which is readily influenced in this way. (In this connexion see a paper on 'Methods of Corn Breeding,' in *West Indian Bulletin*, Vol. IV, p. 9; also an article in the *Agricultural News*, Vol. I, p. 229, on experiments in maize breeding carried out at Jamaica and Antigua.) In the Virginian experiments under consideration, attempts were made to improve local strains of Leaming corn by crossing with thorough-bred strains of the same variety from Illinois, and an increase both in yield and quality of corn resulted. It is stated that in one case, as the result of crossing, a yield of 79.46 bushels per acre was obtained, as against 47.73 bushels given by the

uncrossed native strain the year previous. In a second case, the yield was increased from 54.94 bushels to 81.69 bushels. The local strain was used as the mother plant, and was fertilized with pollen from plants of the imported strain.

By suitable crossing, also, other characteristics of the maize plant, such as size of stalk, number of leaves, length and shape of ear might be modified by a grower who wishes to evolve a definite type, and who, with this end in view, exercises due care in the selection of the ears to be used for seed.

This applies to plants other than maize, and there is no reason why growers should not make a few experiments of this kind for themselves on a small scale. The results obtained would be interesting, and might prove to be the means of considerably enhancing both the yield and quality of his crops.

## SUITABLE SOILS FOR COCOA-NUT CULTIVATION.

In the *Journal d'Agriculture Tropicale* for April last, the subject of the most suitable soils for cocoa-nut cultivation is discussed. The writer of the article reports that he has seen the cocoa-nut palm flourishing on many different kinds of soils—in Trinidad on banks of sand formed by marine alluvial; in the Port Antonio district of Jamaica on lands of coral origin, as also at Zanzibar; while in the Seychelles Islands cocoa-nut plantations flourish on soils formed by the disintegration of primitive rocks. In each of these countries cocoa-nut growing is a profitable industry. Heavy soil is referred to as being decidedly unsuitable for cocoa-nut plantations, while it may be laid down that one of the most suitable is a light soil of a calcareous nature, mellow and deep.

The fact that cocoa-nut palms do well on sandy soil by the sea-shore is attributed not to the effect of sea-water or sea-salt, which, however, does not seem to have any adverse influence, but partly to the presence of lime and organic matter in the soil; while it is also pointed out that, in such a situation, a deep-rooted plant like the palm in question, is able to take advantage of supplies of food brought down in solution by water percolating from higher levels to the sea.

The writer of the article comments on the small number of cocoa-nut trees to be seen in Barbados, and is forced to conclude that this is owing to the unsuitable nature of the soil, which he refers to as being deficient in water-retaining properties, as well as in capillary action—by which the water is raised from lower depths to the roots of plants.

It is to be doubted whether these conclusions are justifiable. There is an abundant underground supply of water, and the coral subsoil forms a remarkably good capillary medium. Further, it is stated in Schomburgk's *History of Barbados*, that previous to 1831 the coast regions of Barbados were studded with cocoa-nut trees, and the sale of the nuts is reported as having been a most remunerative industry. Most of the trees were destroyed during the hurricane of 1831. A good many are said to have been replanted, but the same authority states that an insect pest shortly afterwards appeared in the young plantations, and was the cause of the destruction of thousands of trees. The lack of cocoa-nut trees in Barbados is more probably due to neglect of the industry in the past, as a result of the ravages of the insect pest mentioned, than to the unsuitability of the soil.





## WEST INDIAN FRUIT.

### FRUITING OF DATE PALMS AT DOMINICA.

The following note in further reference to the fruiting of date palms at Dominica (*Agricultural News*, Vol. VI. p. 308), has been received from Mr. Joseph Jones, Curator of the Dominica Botanic Station:—

Since writing the note on the fruiting of a date palm in Dominica, I have to report that a second date tree has produced two fine clusters of fruit. As the dates began to ripen, birds were attracted to them, so the clusters were cut, and ripened indoors. They proved very excellent dates, being twice the size of the variety of date that first fruited, and much superior to it in flavour. The fruit ripened well, there being very little loss by decay or fermentation. This date is probably the Tafilat variety, which was introduced along with two other kinds of dessert dates in 1891. It is fortunate that the palm has several suckers growing at its base by which the variety may be propagated.

In course of time the date should become a valued fruit in the drier parts of the West Indian Islands. It is easily grown and the clusters of fruit, when approaching maturity, can be cut and successfully ripened under cover.

### BANANA TRADE IN FRANCE.

Bananas appear to have become as popular in France as they are in England, as will be seen from the particulars given below. The British Consul at Havre mentions in his report for the year 1906, that at present practically all the French supplies of this fruit come from the Canaries, and he points out that an attempt should be made by West Indian growers to cater for this market. The Consul writes:—

France, like other countries, has learned to appreciate foreign fruits, especially when her own are out of season, and the freezing chamber and cold storage have brought all fruits within easy reach even during the off seasons. France, however, protects her fruit trees while they are resting, and consequently foreign fruit is sold at higher prices than in the United Kingdom; and yet the demand for it is increasing by leaps and bounds. It is wonderful how popular bananas have become in France; they are hawked about the streets and are found on every table. Not so long ago the banana was a rarity, now it is to be found hanging up in every fruiterer's window. In 1877, only 5,000 bunches of bananas were imported into France; this rose in 1901 to 50,000 bunches, and in 1904 to 250,000 bunches. Paris takes about half

this quantity, and then the two chief consumers are Marseilles and Bordeaux. The bulk of the bananas consumed in Europe are imported from the Canary Islands by British firms. The West Indian banana does not appear to have reached the continent in any great quantity yet.

The wholesale price of a bunch is, on the average, 15 francs 50c. (12s. 6d.). The bananas are sold retail at 3 sous apiece and as they are from 150 to 200 bananas on each bunch that price brings the retail price of a bunch to from 20 to 25 francs (15s. to £1), which gives a profit of from 5 to 10 francs (4s. to 8s.) per bunch.

The bananas sold in the south of France, and in Algeria, although sold under the name of Dahomey bananas, as a rule all come from the Canaries. The highest prices are obtained in the spring and autumn. Before France, encouraged by the high prices she has to pay for her bananas, takes to growing them herself in the many colonies suitable for their cultivation, it would be well for British firms to stimulate the importation and taste for Jamaica and West Indian bananas which are far finer than the Canary fruit.

### COCOA-NUT CULTIVATION IN THE NEW HEBRIDES.

The cultivation of cocoa-nuts has become an important agricultural industry in the New Hebrides Islands and several French companies have started operations in this connexion.

In the island of Apia about 8,000 trees have already been planted, and the area is still undergoing extension. Before planting the young cocoa-nuts, crops of maize are grown on the cleared land; this not only provides a useful fodder crop for cattle, or may be used as a green manure but is also valuable in giving a light shade to the young palms.

According to a short article in the July number of the *Tropical Agriculturist*, the land to be planted with cocoa-nuts is cleared of forest growth, which is then burnt. The soil is then lightly tilled, and the maize sown. When the maize plants are about 18 inches high, the germinated nuts are planted out in rows, there being a distance of 24 feet from plant to plant, and the same distance between the rows.

The cultivation of the maize is carried on for two years in this way, after which time the young cocoa-nut palms are allowed to grow by themselves, and it is stated that the generally robust character of the young plants indicates the benefit derived from the provision of this shade in the earlier stages of their growth.



## PICKING AND PACKING ORANGES AND GRAPE-FRUIT.

The detailed advice contained in an article in the September number of the *Cuba Review*, as to the best methods of handling oranges and grape-fruit, so that these products shall appear to the most advantage on the market, and yield the best returns, are as worthy of consideration by growers of citrus fruits in these islands, as by planters in Cuba.

Stress is laid upon the importance of not picking the fruit until it is ripe. The skin is then well-coloured and the juice sweet. The grape-fruit has lost its bitterness, and acquired its characteristic flavour. After picking, the fruit should not be exposed to the sun, but covered and set aside in the shade.

Each fruit should be gathered by hand and cut from the tree by means of clippers, and must be cut off close to the

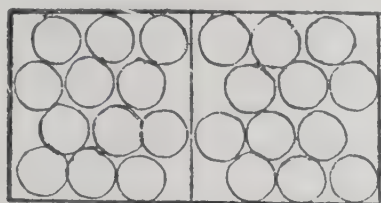


FIG. 24 (a).

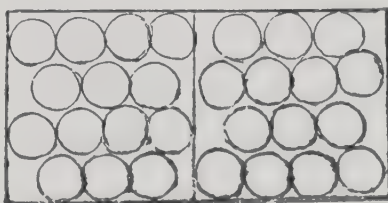


FIG. 24 (b).

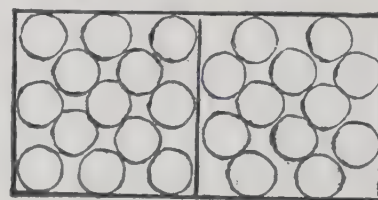


FIG. 24 (c).

stem, otherwise the stubs of stems may injure other fruits when packing. The skins of the oranges and grape-fruit are full of moisture, very brittle and easily injured, and they must not be poured from one receptacle to another, as the slightest bruise will result later in rotten spots and decayed fruit.

The rattan basket, which is in general use in Florida, is recommended as the best receptacle in gathering. This is a stout basket with thick sides, and protects the fruit well. It is about 18 inches high at the back, and 15 inches high in front, and holds about a bushel. Two stout rings are fixed to the rim, and through them a strap may be passed, which supports the basket on the shoulder. When full, the oranges or grape-fruit should be transferred one by one to field boxes. As curing may conveniently take place in these boxes, it is recommended that they should be slightly shallower than the ordinary orange packing box, and care should be taken not to fill them too full, since it is often handy to place them one on top of the other in the packing house, and there is danger of bruising if the fruit projects even a little.

Early in the season four or five days will be required for curing the fruit, but later this process will be completed in about two days. As already mentioned, an easy way to cure the fruit is in the field boxes. They should be stacked up one on the other, allowing for circulation of air. In curing, the moisture in the skin escapes, leaving the skin thinner, tough, leathery and pliable. If packed fresh from the tree, without curing, this moisture wets the wrapping paper, and so induces rot. Damaged fruit can be removed at the end of the curing process, as slight injuries and bruises then show up.

Grading and sizing must also receive careful attention if the produce is to command the greatest success on the market. It is recommended that the fruit be divided first into two groups—'brights' and 'russets,' the first group containing all those of most attractive colour. The 'brights' should then be divided into three grades, according to appearance, size, and quality, the first being a 'Fancy'

grade, bright, smooth-skinned, and free from specks and injuries. No fruit should be packed for market that is not perfectly solid, and free from bruises and rot. The 'russets' may also be graded into three qualities, but only two of these should be put on the market, the remainder being thrown aside.

The most convenient box for packing the produce is what is known as the Florida orange box. This contains exactly 2 cubic feet of fruit, and is separated into two compartments by a middle partition, each compartment measuring 12 x 12 x 12 inches inside. For accurate sizing of the fruit, which is essential for perfect packing, a good machine is necessary. These machines cost about \$30 each, and they size the fruits according to their largest diameter. In default of a machine, sizing may be done by means of a board with notches or spaces cut into one side, but these must be cut carefully, and there must be several of them.

Before packing, the individual fruits are wrapped in paper, which should be thin and strong.

To pack the fruit so as to ensure the most satisfactory results the oranges or grape fruit should be placed in the box in rows and layers according to a definite plan. The system adopted by the orange shippers of Florida is indicated in the diagrams (Fig. 24). Each layer is pressed into place, the fruit standing about  $\frac{1}{2}$  inch above the side when the box is filled. The cover is put on, pressed firmly into place, and nailed down.

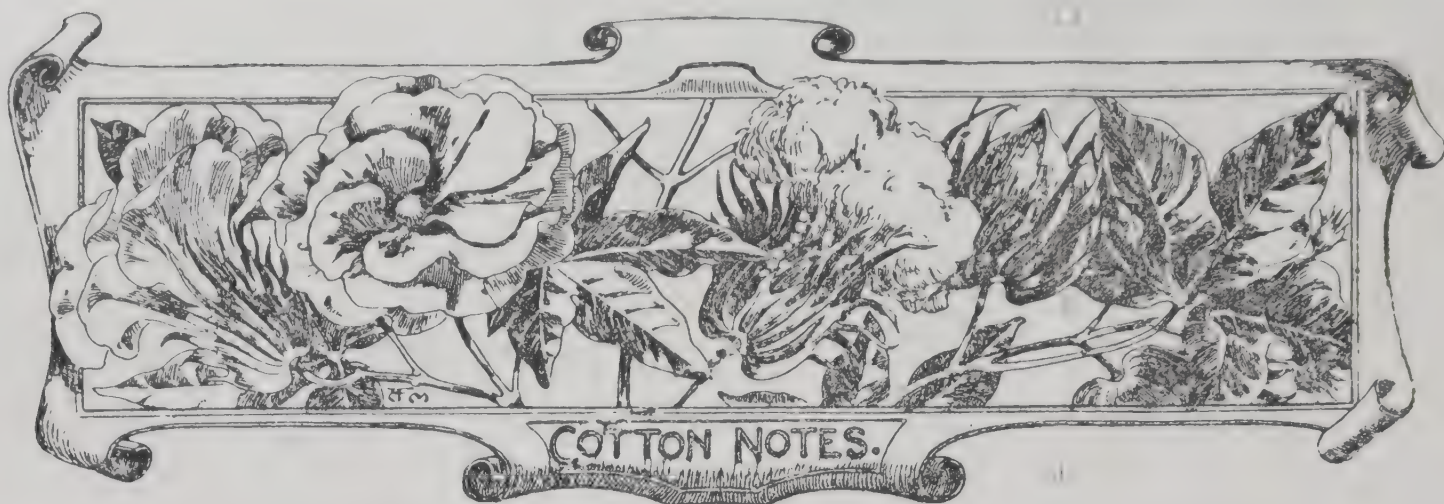
## DEPARTMENT NEWS.

The Imperial Commissioner of Agriculture, who has been representing the interests of the West Indies at the Canadian National exhibition at Toronto, after visiting Montreal and New York, sailed by the S.S. 'Guiana' on October 12, en route for Barbados, via the Northern Islands. Sir Daniel Morris will spend some time in the Northern Islands, and is expected to arrive at head-quarters about the middle of November.

Mr. H. A. Ballou, M.Sc., Entomologist on the staff of the Imperial Department of Agriculture, sailed by the S.S. 'Sobo' on September 18, for the Northern Islands, for the purpose of investigating insect pests. After spending about a fortnight at Antigua, Mr. Ballou proceeded to St. Kitt's-Nevis on October 4; he will leave for Montserrat on October 18, and is expected to return to Barbados by the S.S. 'Sobo' on October 25.

Mr. F. A. Stockdale, B.A., Mycologist on the staff of the Imperial Department of Agriculture, left by the R.M.S. 'Eden' for St. Lucia and Dominica, on September 17, for the purpose of inspecting the Agricultural schools in those islands, and of investigating fungus diseases of plants. Mr. Stockdale returned by R.M.S. 'Esk' on Tuesday, October 8.





### WEST INDIA COTTON.

Messrs. Wolstenholme & Holland, of Liverpool, write as follows, under date of September 30, with reference to the sales of West Indian Sea Island Cotton:—

Sea Island cotton has been in rather better request since our last report, but prices of West Indian are easier, in sympathy with the lower quotations for prompt shipment from Savannah.

The best Georgias can now be purchased at  $17\frac{1}{4}d.$

About 250 bales West Indian have been sold, including Barbados,  $18d.$  to  $21d.$ ; St. Kitt's,  $18\frac{1}{2}d.$  to  $21d.$ ; St. Martin,  $18d.$  to  $21d.$ ; St. Thomas,  $22d.$ ; Montserrat,  $19d.$ ; Nevis,  $18\frac{1}{2}d.$  to  $19d.$ ; Antigua,  $19\frac{1}{2}d.$  to  $23d.$ ; stains,  $6\frac{1}{2}d.$  to  $11d.$ ; and linters,  $1\frac{1}{4}d.$  to  $3\frac{1}{2}d.$

### REPORT ON SEA ISLAND COTTON.

The particulars given below are extracted from the recently published *Annual Sea Island Cotton Report* of Messrs. W. W. Gordon & Co., of Savannah:—

The Sea Island season of 1906-7 was, in point of price advances, without parallel during the past twenty-three years. A remarkable crop failure coincided with an immense demand for goods made from extra-stapled cotton. The situation was further intensified by unprecedented trade activity, and the practical failure of the crop of extra stapled Uplands, which sometimes serves as a substitute for Sea Islands. All other extra-stapled growths consequently commanded abnormally high prices. These conditions, together with the financial independence of producers, caused a series of violent advances, culminating in prices 100 per cent. higher than the ruling prices of the previous season.

During the past season the Florida crop was 20,170 bales, against 42,437 the preceding year: decrease 22,267. Georgia crop 29,413 against 67,215: decrease 37,802. South Carolina 8,037 against 13,712: decrease 5,675. Total 57,620 against 123,364: decrease 65,744. In weight, the Carolina bale averaged 347.05 lb. against 342 lb. last year; Florida and Georgia bale 389.26 against 309 lb. The average price of Carolinas was about 37c. per lb., equal to \$128.40 per bale, against  $27\frac{1}{2}c.$  per lb. last year, equal to \$94.05. Floridas and Georgias averaged 30c., making the value of Floridas and Georgias \$116.77 per bale against an average for Floridas and Georgias of 18c. per lb. last year, equal to \$71.82 per bale.

During the past four years the British West Indian Islands of Barbados, St. Kitt's, St. Vincent, etc., and the island of Porto Rico have been producing Sea Island cotton in gradually increasing quantities. The British West Indian

Islands cotton finds its way to Liverpool, where it is sold in competition with the genuine Carolina Islands. The Porto Rico product is consumed in the United States. We estimate the Porto Rico growth at about 275 bales of 325 lb. each, and the West Indian Islands growth at about 4,500 bales of 350 lb. each. The seed selection in these islands has been carefully maintained, with the result that the quality is highly esteemed, and a suitable seed for replanting has been obtained from year to year.

### COTTON GROWING IN GRENADA.

With a view to introducing the cultivation of Sea Island cotton into Grenada, some experiments have lately been made to test the suitability of the island for cotton growing.

Mr. R. D. Anstead, Superintendent of the Grenada Botanic Station, writing to the Imperial Commissioner of Agriculture, states that the British Cotton-growing Association reported as follows on a sample of cotton grown last year on the Point Saline experimental plot, and forwarded to the Association by the Rev. G. W. Branch:—

Cotton slightly stained, staple long, not very strong, wanting in fineness, value  $16d.$  per lb.

This report on the first year's experimental work may be regarded as fairly satisfactory, and it is hoped that a time will come when the cultivation of Sea Island cotton will be well established as one of the agricultural industries of Grenada.

### METHODS OF COTTON PLANTING.

It is interesting to note the important strides which have been made in cotton planting since its re-introduction into the West Indies. Although it is but five or six years since it was experimentally grown in these islands, the methods adopted for its cultivation are modelled more or less, upon one recognized plan.

In a normal year the planters are satisfied that when cotton is grown in rows, with a distance of from 20 to 24 inches between the plants, the ground is sufficiently covered in the row, and that it is not necessary to grow two or three plants together to obtain the largest crop. They also recognize that by this method it is easier to watch all the plants, and in case of anything arising which necessitates the labourers passing through the fields, as when dusting with Paris green, or in picking the crop, these operations can be done more quickly and better than if the plants had been arranged in any other way.



COTTON SEED SELECTION, 1906-7.

The great importance of seed selection, in the cultivation of Sea Island cotton has, for a long time been recognized, and even in the cultivation of the ordinary qualities of cotton, seed-selection is assuming a very prominent position.

It has long been known that where a very large number of plants of the same variety are grown together, slight variations are always to be found, and this is particularly noticeable in a cotton field. Usually the variations are not of a very pronounced nature, but when each year those plants are selected which show a desirable variation, however slight it may be, the ultimate result will be an improvement in the produce as a whole. Such has been the case with the Sea Island cotton seed selection experiments that have been carried on from year to year in the Sea Island cotton-growing districts of America. The cause of the variations which take place in plants of the same species grown together cannot definitely be stated, but probably a number of different factors are responsible for them. The tendency to produce variation, as shown by Sea Island cotton, however, demands attention for two reasons: first, since it is of great service in affording material for developing special varieties of plants and desirable qualities of cotton, and secondly, because—owing to this varying character of the individual plants—unless seed for planting purposes is specially selected from individual plants, the cotton will become less uniform in quality each year, and so of less value.

The method adopted in these experiments has been frequently referred to in the pages of the *Agricultural News*; and in the *West Indian Bulletin* (Vol. VII, p. 153) this method has been described at some length. Briefly, it is as follows: Each plant in the field is carefully examined as regards its general growth, freedom from disease, prolificness, and quality of cotton produced, and those plants which are most satisfactory in these characters are carefully marked. The seed-cotton from these plants is then picked separately, and subjected to a very critical examination; the best samples are determined, and from these the seed is obtained. The next season, this seed is planted in a nursery in order to produce enough for general planting purposes. All the remaining samples are discarded. When these experiments are conducted on any estate for the first time, each field must be very carefully examined for specially good plants; but when the experiments have been carried on during the previous season, the plants in the nursery only are examined.

The number of plants which are examined on an estate where the experiments are being carried on for the first time is naturally very large. Since about 4,000 plants is the number usually grown per acre, this means that if 20 acres of cotton are gone over, it will necessitate the consideration of as many as 80,000 plants.

The Imperial Department of Agriculture has been very active in taking this work in hand, for, from the first it was realized that if the industry was to be successful, it would be necessary to start experiments, and to supply seed of the highest possible quality.

In the season of 1905-6, seed-selection experiments were commenced in Barbados; and during that year they were conducted on seven estates. In the season 1906-7 the work was extended to ten estates in this island. During this season experiments were also started on five estates in St. Vincent, and a few plants have been selected at the experiment stations in Antigua, St. Kitt's, and Montserrat.

In Barbados during the season of 1905-6, the number of

plants selected in the field were 264, but as the result of the final examination, seed was selected from only fourteen of these.

In 1906-7, 224 plants were selected in the field, and from these, twenty-six were finally selected for seed purposes. During this same season in St. Vincent, 102 plants were selected in the field, seed being obtained from twelve of these after the final examination. The seed from the finally selected plants is very carefully dealt with in each case. On each of the estates where the experiments are being conducted, a special plot of land is set apart as a nursery, and in this nursery the seed is carefully sown, care being taken to have the nursery in such a position that the plants are not likely to be cross-fertilized by those in the general field. Another important factor in selecting the nursery is that the soil and situation shall be nearly as possible typical of the general conditions of the estate.

The principal measurable qualities of the cotton produced by these selected plants in Barbados, during the seasons 1905-6 and 1906-7, and in St. Vincent during the season 1906-7, are clearly shown in the following table:—

	Average length of staple.	Average per- centage propor- tion of weak fibres.	Average diam- eter of fibres.
Barbados. 1905-6	50·7 mm.	27·21	0·0156 mm.
Barbados. 1906-7	47·7 mm.	24·1	0·0155 mm.
St. Vincent. 1906-7	47·7 mm.	22·2	0·0159 mm.

A comparison of these figures is interesting, since they indicate the measurable qualities of the cotton. As regards the length of Barbados cotton, it will be seen that this season, the staple from the selected plants is shorter than that of last year. The reason for this is that, as a result of statements made by Mr. E. Lomas Oliver during his visit to the West Indies during the early part of this year, greater importance has been attached to the strength of the cotton than to its length. In describing the relative values of the various qualities, Mr. Oliver stated that strength was of greatest importance; then came fineness, and next length. This being the case, those responsible for the selection experiments have been willing to make certain sacrifice as regard length in order to obtain strength. It will be noticed that the selected plants of this year contained much less weak fibre than those of the previous season, some of the individual plants this year containing as low as 17 per cent. weak fibre, while last year none produced less than 24 per cent.

The above table does not show clearly the extent to which St. Vincent cotton scores over Barbados cotton, and it should be stated that only a very few samples of cotton produced in the latter island contained a low proportion of weak fibres, whereas this low proportion of weak fibre was a very marked factor in nearly all the samples from St. Vincent.

This year the experiments will again be continued and we hope by these careful and thorough means to maintain the high qualities of West Indian cotton, and thus to place the cotton industry on a more substantial footing.



## EDITORIAL NOTICES.

Letters and matter for publication, as well as all specimens for naming, should be addressed to the Commissioner, Imperial Department of Agriculture, Barbados.

All applications for Copies of the 'Agricultural News' should be addressed to the Agents, and not to the Department.

*Local Agents:* Messrs. Bowen & Sons, Bridgetown, Barbados. *London Agents:* Messrs. Dulau & Co., 37, Soho Square, W., and The West India Committee, 15, Seething Lane, E.C. A complete list of Agents will be found on page 3 of the cover.

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# Agricultural News

VOL. VI. SATURDAY, OCTOBER 19, 1907. No. 143.

## NOTES AND COMMENTS.

The editorial discusses the methods which have given the most success in checking the spread of fungus diseases of crops in the West Indies.

A résumé of the results of some important experiments in connexion with maize growing that have been carried out at the Virginia Agricultural Experiment Station is given on p. 323.

The attention of exporters is drawn to the market for West Indian bananas that may possibly be found in France (p. 324). An article giving valuable suggestions as to the best methods of picking and handling oranges and grape-fruit appears on the following page.

'Cotton Notes' include an article of special interest, 'Cotton Seed Selection,' 1906-7; as well as extracts from Messrs. Gordon & Co's *Annual Sea Island Cotton Report*, in which market conditions of the past year are reviewed generally, and reference is made to the Sea Island cotton industry of the West Indies.

An illustrated article dealing with the West Indian displays at the Canadian Exhibitions appears on pp. 330-31.

Considerable attention has been given to rubber planting in Trinidad during the past year (p. 333).

Valuable information with regard to numbers of timber trees found in Dominica, and the uses for which they are suitable, is given on pp. 334-5. The list will be completed in the next issue of the *Agricultural News*.

## Labour Trouble in British Honduras

Excessive exploitation of the timber resources of British Honduras has very much diminished the supply, while, on the other hand, it is stated that the number of men seeking employment as wood-cutters has increased. The situation so produced is discussed at considerable length in a late number of the *Colonial Guardian* of Belize, which points out that the colony has agricultural as well as lumbering resources, and urges the need of directing the young male element of the population into agricultural work. As it is, numbers of able-bodied men are moving to the neighbouring republics in search of wood-cutting work.

The *Colonial Guardian* would like to see a large plantation established by the Government where youths of British Honduras could be apprenticed, and instructed in the principles of cultivation of the crops best adapted to the colony—such as cacao, nutmeg, vanilla, fruit, maize, rubber, and rice. Further, it is suggested that if, at first, grants of small areas of land—10 to 15 acres—were made to the most deserving lads on the completion of their training, no difficulty would be experienced in persuading parents to allow their sons to undergo the period of apprenticeship.

The plan is well worthy of consideration, and if adopted, should not only prove the means of affording a prosperous career to the youths concerned, but also be a help towards developing the agricultural resources of the colony.

## Copra in Samoa.

The cultivation of the cocoa-nut, and consequent export of copra, would appear to afford highly satisfactory returns in Samoa, and is regarded as likely to take the leading position among the agricultural industries of the island, and to give the best returns to investors, unless rubber planting, which at present is in the experimental stage, becomes highly successful.

The prominence of copra as a chief article of export is of quite recent occurrence, as six years ago it was a minor item among the shipments, and little attention was paid to its cultivation. Full crops of cocoa-nuts cannot be expected from plantations until they are from twelve to fifteen years old, so that notwithstanding the promising prospects no increase in the output can be expected for some time; but planting is in brisk progress, and there is no danger of any falling off in the copra yield.

It is reported that the cocoa-nut palm in Samoa is practically free from disease, and this is certainly a strong argument in favour of the growth of any crop, more especially one which costs so little for care and cultivation as does the cocoa-nut, and the produce of which finds so ready a market.

It is stated also, as evidence of the rapidity with which cocoa-nut palms recover after a hurricane, that in Tongatabu three hurricanes occurred during the course of ten years, and in every instance the trees began to yield fruit—and always a large crop—twenty-one months after the gale.



### Rubber Possibilities in Australia.

An article in the last issue of the *Agricultural News* (Vol. VI, p. 319), discussed the prospects of cacao and cocoa-nut cultivation in Queensland, where there exists a possibility that the sugar industry may undergo a partial decadence, in consequence of the repatriation of labourers from the Hawaiian Islands. Rubber is now mentioned by the *India-Rubber Journal* as a product, the cultivation of which may with advantage partially displace that of sugar. Up to the present the Queensland sugar industry has been largely assisted by a special bounty system, under which payments were made to plantations worked by white labour.

In the hope of maintaining the prosperity of the plantation districts, the Australian Commonwealth Parliament proposes during the next fifteen years to give bounties on about a score of agricultural products. Rubber is included in the list, and it is stated that the amount of subsidy will be at the rate of 10 per cent. on the market value. There are already a number of rubber plantations in Queensland, and the cultivation is also being taken up in a subsidiary way by planters. One grower at Geraldton in North Queensland is mentioned as having purchased 10,000 plants (the variety not stated), and planted up abandoned sugar areas.

### Milking by Machinery.

Many machines for milking purposes have of late years been placed on the market, and, as the result of improvements which have recently been made, they will no doubt come into more general use. One maker claims to have sold no less than 1,500 machines of one pattern in Australia, or sufficient to milk 35,000 cows daily.

The great majority of these contrivances have their origin in the United States, and in the *India-Rubber World* of September 1 last, there appears an illustrated descriptive account of a machine recently put on the market in that country. This milker consists in the first place of a large pail with a tightly fitting lid. From nozzles on the lid are given off two india-rubber tubes, about 3 feet long. Each tube terminates in four funnel-like india-rubber cups, which fit tightly on the teats of a cow, two animals being milked at once. Two pipes pass round the cow-stalls, one being a vacuum, and the other full of air at high pressure.

An essential feature of the milker is the pumping apparatus, mounted on the lid, which in alternate pulsations connects the pail, and consequently the india-rubber tubing, first with the vacuum—the result of which is to create a suction, and so to extract the milk—and secondly, with the air pressure pipe, which releases the teat preparatory to again applying the suction, the extracted milk meanwhile passing from the cups, through the tubing, and into the pail.

In the future such machines will no doubt form an essential part of the equipment of every large dairying establishment.

### Balata Trade in British Guiana.

Licences are now granted to collect balata on certain specified areas in British Guiana for periods not exceeding fifteen years. This, however, does not convey the right to plant rubber or balata trees. Five years is regarded as the minimum time in which a balata tree can recover from the effect of bleeding, so that the period covered by the licence allows of three tappings.

It is stated that the Bullet tree, *Mimusops globosa*, from which the balata is obtained, does not by itself cover large forest areas, but is found only in scattered patches, which together form but a small proportion of the total extent of the grant of land.

The illicit bleeding of balata trees is causing considerable trouble to the authorities in British Guiana. The fact that the export duty is remitted by the Government on Venezuelan balata exported through British Guiana ports seems to encourage this illicit bleeding, since the temptation exists to collect balata on British territory, and to declare it to be of Venezuelan origin, thus getting advantage of the remission of duty.

### Report on Botanic Gardens, Trinidad.

Particulars as to some of the work recorded in the report, for 1906-7, of the Superintendent of the Royal Botanic Gardens, Trinidad, have already appeared in the *Agricultural News*, although some important points still remain unnoticed.

The total expenditure on the Department (which now consists of four establishments) during the year was £4,940 6s. 6½d. The sale of plants from the nursery at St. Clair, however, realized £669 6s. 10d., or £249 3s. 0½d. over the amount obtained in this way last year. At the Tobago station the sum of £73 7s. 7d. was received for the sale of plants, which is nearly double the receipts of last year. The increased demand was for rubber plants and seeds, grafted mangos, budded oranges, seedling sugar-canes, timber trees, and cacao. The number of plants distributed gratis was even larger than the number sold. In spite of the enhanced demand, however, there still remains a stock in hand at the nurseries, equal to that of any previous year.

In view of the frequent statements that are often made as to the decreasing timber resources of various countries, it is satisfactory to note that something at least is being done towards planting in Trinidad. During the year, over 15,000 young trees were distributed from the Botanic Station, and it is stated that orders have already been received for a similar number during the coming year, principally cedar and mahogany.

The Government cacao plantation at River estate in common with most others in the island last year, gave only a reduced return, but still showed a credit balance of £143 4s. 9½d.

Tobacco from the experimental plot was cured and sold at 1s. 8d. per lb., without duty, as much as 4s. per lb., however, being offered for the best quality.

The appendix to the report gives details of the work of the Agricultural Instructors during the year.



## CANADA AND THE WEST INDIES.

It has been realized from past experience by many in the West Indies, that the National Exhibitions held every year in Canada form the best means of bringing the products and resources of these colonies before the people of the Dominion. Further, the visit of the Canadian Trade Delegation to this part of the world early in the present year, and the report they presented on their return, indicated that the present was a specially favourable time for endeavouring to bring about closer commercial relationships between Canada and the West Indies. On these accounts, therefore, special efforts were made by the Imperial Department of

of a Gold Medal to the West Indian Court, and Diplomas of Merit to the exhibits from the several islands concerned, as well as by the great interest taken by visitors to the Exhibition in the products of these colonies, and the lengthy descriptive notices which have appeared in the Toronto papers, is now a matter for general satisfaction in the West Indies.

Sir Daniel Morris, in an official letter to the Governor of Barbados, dated September 11 last, referred to the attractive appearance of the Barbados collection of products at the Exhibition, and mentioned that the excellent manner in which



FIG. 25. WEST INDIAN COURT AT CANADIAN EXHIBITIONS, 1907.

Agriculture to induce the various islands to send thoroughly representative collections of produce to Toronto and Halifax. The local Permanent Exhibition Committees took up the work with energy, and exhibits were forwarded to Canada from Barbados, Dominica, Grenada, Trinidad, St. Vincent St. Lucia, Montserrat, Antigua, St. Kitt's and the Virgin Islands, as well as from Demerara. The accompanying illustrations represent the arrangements of the various displays from the West Indian Colonies at the Exhibition.

The great success which attended the West Indian exhibits at Toronto, as evidenced by the award

everything had been packed was especially worthy of remark, the result being that everything arrived in remarkably good condition. The series of Fancy and other Molasses attracted a good deal of attention, and every opportunity was offered to merchants and others interested to obtain commercial samples of the products of these islands. Copies of the illustrated pamphlet, 'The West Indies in Canada,' prepared by the Imperial Department of Agriculture, were freely distributed at the Exhibition, as well as small handbooks containing information as to the products of the several islands. Sir Daniel also wrote letters similar to the above to the Governors of the other West Indian Islands which forwarded exhibits to Toronto, and in them he states his conviction



that these islands will derive material benefit from the representations of their products at the Canadian Exhibitions, and that the time and money expended will be fully justified.

In the course of a speech in reply to the toast of his health, at a luncheon given by the Directors of the Toronto Exhibition to a large number of manufacturers and business men, on August 29, the Imperial Commissioner of Agriculture referred to the question of closer trade relations between the West Indies and Canada and the possibilities that exist for a large business between the two countries concerned. He pointed out that in spite of the present depressed condition of the sugar industry in the West Indies, the value of the sugar produced formed 42 per cent. of the total products

grown in the West Indies and their grape fruit and lime juice were also to be recommended.

In conclusion, Sir Daniel Morris emphasized the fact that the West Indies and Canada could not compete with each other in their natural products, since each was the complement of the other. He urged Canadians to establish closer commercial relations with the West Indies, and assured them that the people of these islands would most gladly take a share of Canadian goods.

The Imperial Commissioner of Agriculture was also present on August 30 at a luncheon given to educationists by the Directors of the Exhibition, and on September 4 a complimentary luncheon was given to Sir Daniel Morris, at

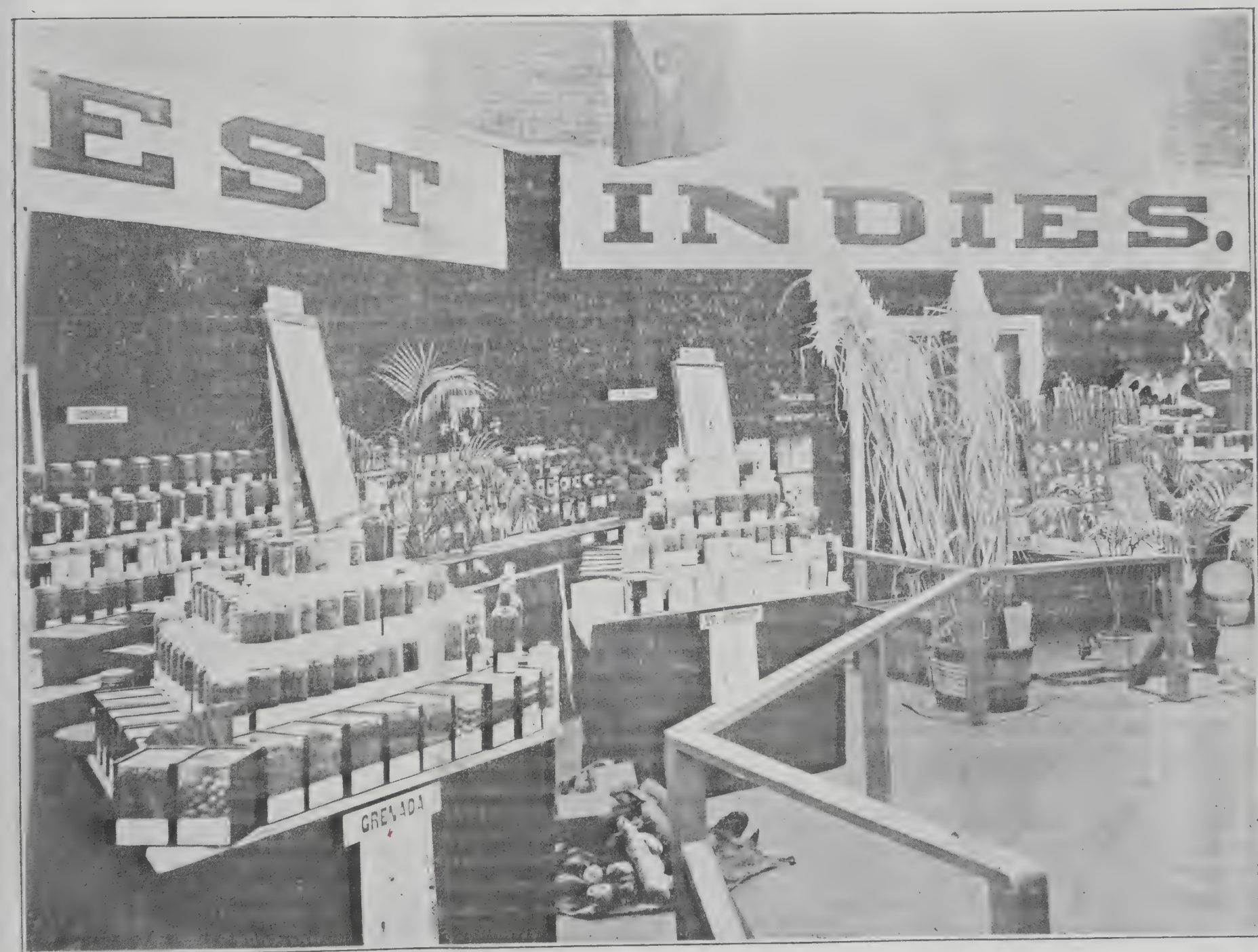


FIG. 26. WEST INDIAN COURT AT CANADIAN EXHIBITIONS, 1907.

of these islands and of British Guiana, and he believed that from the natural conditions they possessed, the West Indies could grow sugar as cheaply as, or perhaps more cheaply than, any other country in the world. Canada took a large amount of West Indian sugar. It also took an enormous quantity of molasses and syrup. Cacao, too, was another article of West Indian produce consumed in great quantity in Canada, and there was no reason why these islands should not supply the whole Canadian demand. The coffee

the National Club of Toronto, by a number of the principal merchants of the city.

At the close of the Toronto Exhibition the West Indian exhibits were carefully packed, and forwarded to Halifax, the Exhibition at which commenced on September 25.

It should be mentioned that a good deal of thanks is due to Messrs. Pickford and Black, who kindly conveyed all the West Indian exhibits to Canada, free of charge.





## GLEANINGS.

Cotton is grown in practically every province of Korea, and the area devoted to the crop is rapidly extending.

The total area devoted to cocoa-nut cultivation in Ceylon is 650,000 acres. The average number of trees to the acre is 92, and the average annual yield of nuts per acre 1,260.

The total production of rubber throughout the world is at present estimated at about 60,000 tons per annum. The country absorbing the greatest amount of rubber is the United States, which every year buys something like 28,000 tons.

During the first six months of 1907, British Guiana has exported 3,950,000 lb. of rice, an enormous increase over the shipments of the corresponding period of 1906, which were no more than 611,000 lb.

The cacao area of Tobago was  $26\frac{1}{2}$  acres greater in 1906-7 than in 1905-6. The shipments of cacao during 1906-7 were 23,278 lb. in excess of those of the previous year. (*Annual Report on Botanic Station, 1906-7.*)

A recent report issued by the U.S. Forest service at Washington puts the area of the forest reserves of the United States, Alaska, and Porto Rico at almost 150,000,000 acres, this being about twice the area of Great Britain and Ireland.

Messrs. Henry W. Frost & Co's. Sea Island cotton report of September 28 last, states that growers in Georgia and Florida complain of excessive rain, which is causing shedding of the bolls, and a delay of the cotton harvest.

The third annual sale of live stock at the Government Farm, Tobago, will take place on November 27 next. The animals to be disposed of include five bulls, six cows, eight heifers, and two pairs of working oxen, as well as calves, pigs, and poultry.

As a result of the very propitious weather lately experienced in Trinidad, the *Port-of-Spain Gazette* of September 29 last, reports excellent prospects for the coming cacao and sugar crops. The cacao trees are stated to be laden with fruit.

Analysis of fresh tomatoes shows that they contain 93.5 per cent. of moisture, 0.95 per cent. of albuminoids, 0.2 per cent. of fat, 3.6 per cent. of carbohydrates, and 0.74 per cent. of ash, of which 0.12 per cent. was calcium phosphate; 0.48 per cent. malic acid, and 0.09 per cent. citric acid.

The cultivation of the Java-Natal indigo plant has of late years considerably extended in Bengal, with the result that a recent Blue-book records that the quality of the indigo produced in the province is showing marked improvement. (*Textile Mercury*, August 17.)

The value of the agricultural crops raised in the United States in 1906 was estimated at £1,404,000,000, this being £100,000,000 in excess of the estimate for 1905. Of this enormous total, food products are estimated at about £620,000,000. (*British Consular Report, 1906.*)

Rice meal, which, it is stated, is looked upon as a waste product by the growers of Trinidad, and is thrown away by them on winnowing the grain, really forms a nutritious article of diet when fed to milking cows and other stock. It is largely used in this way in England, where it commands a price of £4 to £5 per ton.

A non-bitter form of quinine, for administration to children, has been introduced by Professor Celli of Italy. This consists of quinine tannate, or the tannic acid salt of quinine. It is practically insoluble in water, and hence is tasteless. The salt is decomposed by the digestive juices, and the quinine set free. (*Pharmaceutical Journal*, August 31.)

During the year 1906 the number of small holdings in Dutch Guiana increased from 5,000, with an area of 32,123 acres, to 5,400 with an area of 35,815 acres. The larger portion of these are held by British Indian immigrants who have completed their term of indenture. (*British Consular Report 1906.*)

An attempt is being made to induce the small land holders of Dutch Guiana to take up the cultivation of Surinam coffee, which grows well in the colony, and a considerable number of plants have been distributed from the Botanic Gardens. Owing to the high price of labour, however, the industry is not likely to develop at present. (*British Consular Report, 1906.*)

The *Hawaiian Forester and Agriculturist* states that a company has been formed to engage in the production of copra in the Koolau district of Hawaii. It is stated that though the cocoa-nut palm does not flourish as well as might be wished in those islands, there is every prospect of the industry being profitable, since planting will only be conducted on land of little other agricultural value.

At present only one regular cotton-seed mill exists in India, this being situated at Myingyan on the Irrawaddy in Burma. Seed-cotton is purchased wholesale in Bengal, Madras, and Madras, the cotton sold after ginning, the seed crushed for extraction of the oil, which is afterwards refined and the residue made into soap. The cotton-seed factory alone has an annual income of about £10,000. (*Textile Mercury*, September 14.)



## RICE PROSPECTS IN BERBICE.

The Demerara *Argosy* of October 5, contained the following particulars from its New Amsterdam correspondent as to the prospects of the present season's crop in Berbice:—

The planting of rice in the Canje district has proved an entire success. The competition amongst the agents and sub-agents commissioned to purchase paddy in this district is particularly keen. The consequence is, however, immensely favourable to the growers, who are earning much more than they ever anticipated. The cost per bag of paddy ranges from 6s. to 8s. The prospects to rice growers in other districts are equally favourable, despite the adverse weather during the early part of the year. On the Corentyne, the largest crop will be reaped at Plantation Port Mourant, where over 1,000 acres of land are under cultivation. Albion plantation seems to come next, with about 700 acres: but it is feared that the crop in this district will fall considerably below the original estimate by reason of the want of adequate water for irrigation purposes at an early stage of the cultivation.

## RUBBER PLANTING IN TRINIDAD.

Judging from the *Annual Report* (1906-7) of the Superintendent of the Botanical Department, Trinidad, rubber planting is at present attracting a good deal of attention in the island. Nearly 26,000 trees are reported to have been distributed last year, as compared with nearly 12,000 the year previous.

Hevea rubber is naturally the most popular variety, the number of trees of this kind planted last year in Trinidad being estimated at no less than 20,000. The demand was so far in excess of the supply that importation of seeds and plants were made from Ceylon and elsewhere. The results, however, were very disappointing. In some cases no more than 4 per cent. of the imported seeds germinated, although in other instances 50 to 60 per cent. of plants were obtained from the seeds. Hevea seeds produced in the colony, however gave better results, over 98 per cent. germinating.

Some Hevea trees at the Botanic Gardens, nine years old, are 40 feet in height, and at 3 feet from the ground have a circumference of 2 feet. Samples of rubber from these trees have been forwarded to the Imperial Institute for examination and report. It is stated that when the wounds made in tapping were treated with coal tar, they healed up much more readily than when untreated.

The Funtumia trees at the Botanic Gardens are reported to have grown well during the past year, and the sale of plants and seeds of this variety was also large. It is early as yet to say anything as to the merits of this rubber in the West Indies, compared with Hevea and Castilloa, but every hope is entertained that it will prove a good producer.

Large numbers of Castilloa rubber trees were also planted during 1906, which, it is stated, may be looked upon as the first year in which Castilloa rubber was shipped from Trinidad in marketable quantity. The consignments sent home have met with ready sale, and the pressed block rubber has commanded a price of 4s. 4d. per lb. The most recent consignment consisted of over 1,000 lb. of clean rubber.

The Castilloa variety is now well established in Trinidad, where the conditions appear to suit it very well. Hundreds of self-sown trees are reported to be springing up in the

forest near the Botanic Gardens, and birds being very fond of the fruit of the Castilloa, they spread the seeds far and wide.

Castilloa seeds are still in great demand in Trinidad, and it is estimated that the Department will dispose of as many as 50,000 during the coming season, while private growers will probably sell ten times that number.

It is stated that the Trinidad rubber producers are of opinion that a higher net return is obtained by the preparation of 'scrap' rubber, than in making 'block' or 'sheet' rubber, as the increase in price paid for the higher qualities is not sufficient to pay for the extra cost of preparation.

## CACAO, COFFEE, AND RUBBER IN BAHIA.

The Brazilian State of Bahia possesses some of the most fertile land in the republic, and judging by the last *Annual Report* of the British Consul—an extract from which is given below—the Bahian planters derive their most considerable profits from the cultivation of cacao, coffee, and rubber:—

The output of cacao from the state of Bahia has nearly doubled within a period of six years, the quantity exported having increased from 13,000 tons during 1900 to over 23,500 tons during 1906. The state as a whole is well suited for cacao cultivation, and the planters there, having discovered that they can secure more certain and larger profits from its cultivation than from the production of either tobacco or coffee, are wisely devoting their efforts to increasing the output of cacao. Of the total output during the year 1906, about 40 per cent. went to the United States; most of the balance went, in about equal portions, to France and Germany. Bahia cacao is graded for the market purposes into three qualities, viz., 'superior,' 'good,' and 'fair fermented.' Hitherto all of the Bahia cacao has been dried by exposure to the atmosphere, but lately some planters have dried their cacao by means of artificial heat, produced by stoves. Such artificially dried cacao—which is termed 'estufa' cacao—is of very much better qualities than the varieties dried by exposure to the atmosphere.

The bulk of the coffee produced throughout the state of Bahia is of comparatively low grade, but in the hilly district of Chapada, which is situated in the southern portion of the state, there is produced a coffee of exceptionally fine quality which, although but little known in European markets, is deserving of special attention on the part of the dealers in high-grade coffee. The Chapada coffee is small of berry, clean and attractive in colour, and it yields a beverage of exceptionally fine aroma and delicate flavour. The output of Chapada coffee averages from 20,000 to 30,000 bags annually.

The export rubber from the state of Bahia has increased more than tenfold within the past six years, having risen from 100 tons in 1900 to over 1,100 tons in 1906. Of the total quantity of rubber exported annually, the greater portion has hitherto been of low grade, consisting mainly of a variety known as 'Mangabeira' rubber, which comes from the adjoining state of Minas Geraes, and Piahy. But it has lately been discovered that the state of Bahia is very rich in a rubber-producing tree, locally known as 'Jiquiê Manicoba.' The tree in question is a new and distinct species of Manihot, which apparently is peculiar to the state of Bahia. The discovery is a matter of much importance not only for the state but also for the rubber trade in general, inasmuch as the rubber obtainable from the Jiquiê Manicoba, when properly prepared, would seem to be fully equal in quality to the best product of the Para region.



## USEFUL TIMBER TREES OF DOMINICA.

The particulars given herewith as to the timber trees of the island of Dominica, and the uses for which they are suitable, were compiled by the late Dr. Imray, and originally appeared, many years ago, in a Dominica Almanac, a copy of which was recently forwarded to the Imperial Commissioner of Agriculture through the courtesy of the Hon. W. H. Porter, Treasurer of Dominica. Dr. Imray's list is here reproduced, as the information should certainly prove of interest to planters and others interested in the resources of the island.

After an introductory paragraph dealing with the condition of the agricultural industries of the island, the article continues:—

The number and variety of woods produced by so small a country may possibly be considered a point of some interest. Our lofty mountains, indeed, afford different climates according to elevation. The deep ravines and sheltered valleys, the low-lying lands on the windward and leeward exposures of the island, and the high mountain sides and ridges furnish different varieties of trees and plants.

Our best hard-wood trees, such as the Courbaril, Satin Wood, Mastic, Bully-Tree, etc., are chiefly found on the leeward side of the island, where the heat is greatest, and less rain falls. But hard-wood trees are found growing in all parts of the island, both near the coast, high upon the mountain sides, and in the valleys of the interior. The most valuable of our hard-wood trees are probably furnished by the natural order Sapotaceae. In this order are the Bully Trees, Mastic, varieties of Bois Balate, etc. But the timber most generally used in this country for all ordinary purposes, comes from trees of the Laurineae, in which order are found many different kinds of valuable timber trees. For the most part, the timber of this family is easily worked; the trees are of moderate size, and growing in all parts of the island. They are cut down and sawn into boards, etc., on the spot, or split up into shingles and staves.

The valleys and ravines in the interior of the country are covered with extensive forests of valuable timber trees. The difficulty in the way of these forests being made useful to the country is the want of roads to open up the interior.

**Coubaril, or Locust tree** (*Hymenaea Courbaril*). Valuable timber tree of large size, wood dense and close grained, used for making all kinds of furniture: formerly employed in house building, now too valuable for that purpose; resembles mahogany, but is much harder; not durable in the ground.

**Satin wood, Yellow Sanders or Noyer.** Large tree; beautiful and valuable wood, becoming scarce in the country; now chiefly used as a furniture wood; formerly in house building and mill work; very durable in the ground.

**Mastic or Acomat** (*Sideroxylon*, sp.). Very large tree, reaches to 6 feet in diameter; used for mill work and in house building, available for almost every kind of work; one of the most valuable woods in the island.

**Bully Tree or Balata** (*Bumelia retusa*). Very large and valuable timber tree, attains a diameter of 6 or 7 feet; used for all kinds of mill work, rollers, beams, water and balance wheels, sills, cogs, plates, etc., also applied to house work.

**Cedar** (*Cedrela odorata*). Large tree, an excellent furniture wood, the odour repels insects; used for house and ship building.

**Calba** (*Calophyllum Calaba*). Lofty tree, 4 or 5 feet in diameter; timber valuable for mill rollers, frames, and

other mill work; pretty cabinet making wood, very durable, lasts well in the ground, bears exposure to moisture.

**Resinier grande feuille** (*Coccoloba* sp.). Large tree nearly 4 feet in diameter; dense, close-grained wood, valuable timber, employed in all kinds of house and mill work; one of the most durable woods of the island; becomes hardened by age, so that tools can scarcely work it; almost indestructible in the ground.

**Resinier petite feuille** (*Coccoloba* sp.). Tree 2 to 3 feet in diameter, very durable in the ground; used for posts, etc.

**Black cinnamon or Bois d' Inde.** (*Pimenta acris*). Large tree, about 4 feet in diameter; one of the hardest and heaviest woods the island produces; very durable, good for rollers and other mill work, especially cogs, posts in the ground, sills, etc.

**Bois Lezard** (*Vitex Æiviricata*). Large and lofty tree, one of the best and most lasting woods for house building; used for making shingles, posts in the ground, mill posts etc.; durable in water.

**Adègon** (*Ardisia* sp.). Large tree, 4 or 5 feet in diameter; useful for all purposes, boards, planks, mill work house work, ship building, shingles; lasts well in water.

**Angelin** (*Andira inermis*). Large tree, employed for all kinds of house work, inside and out; for mill work, rollers, etc.; valuable timber, lasts well in water.

**Iron wood or Bois de fer noir.** Tree 12 to 18 inches in diameter, very durable wood; used for posts; also cabinet maker's wood.

**White iron wood or Bois de fer blanc.** Tree same as above; uses also the same, but the wood is not so lasting as the black species.

**Amandier** (*Prunus occidentalis*). Large tree, 3 or 4 feet in diameter; sawn into boards and plank, used for mill work and inside house work; also for furniture wood; the seeds are used for making the liqueur 'Noyeau'; the bark is sometimes put into rum, to give it a flavour.

**Cacoenier** (*Ormosia dasycarpa*). Large tree, 3 or 4 feet in diameter; useful wood for all kinds of house work, inside and out, rafters, posts, etc.

**Epineux rouge** (*Zanthoxylum Ochroxyllum*). Small tree, good for posts, lasting in the ground, available for fancy cabinet work.

**Epineux blanc.** Large tree, sawn in boards and planks, employed in house work inside and out, rafters, posts, etc., cabinet work.

**Epineux petite feuille** (*Zanthoxylum* sp.). Small tree, durable wood for posts.

**Tendre Acailioux.** Small tree, pretty cabinet wood, very durable in the ground as posts.

**Rosewood** (*Cordia Gerascanthus*). Tree 2 feet in diameter, employed for all kinds of house work, ship building, and in furniture.

**Citronelle.** Tree, 1 foot in diameter, used for house posts, small work.

**Petit citron. Chene du pay** (*Ilex cuneifolia*). Tree 18 inches in diameter; very useful wood, employed for all kinds of house work, rafters, sills, posts, cart felloes; makes excellent oars.

**Brisiette.** Middling-sized tree, sawn into boards and planks, and employed for inside house work; very good furniture wood; chairs and tables are made of it.

**Savonette** (*Lonchocarpus violaceus*). Good-sized tree, 2 feet in diameter; valuable timber, available for many purposes, mill rollers and mill work in general, posts, beams, cart naves, and felloes, blocks for pulleys, ship and boat building.



**White cedar** (*Tecoma leucorylon*). Large tree, timber employed for inside and outside house work, also in ship building; lasts well in water.

**Goyavier** (*Eugenia aeruginia*). Tree, about 2 feet in diameter; light wood, used for inside house work, rafters, posts, plates, etc.

**Carapite**. Large tree, 3 or 4 feet in diameter; employed for mill work of all kinds, and house work.

**Bois Branda**. Large hard-wood tree; rollers for small cattle mills are made of this wood; all kinds of mill and house work.

**Mois mat**. Middle-sized tree; makes good masts for vessels, also oars, spars and staves.

**Bouis Fourmi** (*Ilex* sp.). Large tree, sawn into boards and planks, employed for all inside house work, posts, etc.

**Bois Bouis Chien** (*Chrysophyllum microphyllum*). Timber tree, makes good boards, planks, posts; used for all kinds of inside work; made into shingles; furniture wood.

**Bouis** (*Chrysophyllum glabrum*). Large tree, about 4 feet in diameter; timber employed for mill frames and rollers, house work, posts, etc., wood not very hard, but durable.

**Petit Bouis**. Tree about 1 foot in diameter; very durable wood, available for posts, rafters, beams, etc.

**Gommier** (*Dacryodes hexandra*). Probably the largest and loftiest tree the island produces; nearly all the canoes of the island are made of this wood; whitish resinous substance exudes copiously from the trunk of the tree; this resin is much used in making flambeaux, also in the Roman Catholic places of worship as incense.

**Bois pin** (*Talauma Plumierii*). Large tree, lours used for inside house work.

**Bois piquette** (*Ixora ferrea*). Wood hard and tough, used for axe handles, posts, and for making flambeaux; lasting in the ground.

**Bois d'Orme** (*Guazuma ulmifolia*). Tree 2 to 3 feet in diameter; sawn into boards, useful for oars, posts, staves, etc.

**Icacque** (*Hirtella triandra*). Small tree; wood used for inside and outside work.

**Icacque Montagne**. Small tree, wood used for posts, plates, rafters, etc.

**Cafe Marron** (*Faramea odoratissima*). Small tree, used for posts, rafters, plates, etc., in house building.

**Pois Doux** (*Inga laurina*). Small tree; makes excellent charcoal, employed as posts for megass (cane trash), house, and other coarse work.

**Pois Doux Marron** (*Inga ingoides*). Middle-sized tree; used for staves, sawn into boards and planks, and employed for indoor work only.

**Pois Doux Marron Blanc**. Tree 3 or 4 feet in diameter; cut into staves and shingles, difficult to saw into planks.

**Bois tan** (*Byrsonima* sp.). Tree about 2 feet in diameter; wood tough and light, made into beams, rafters, posts, oars; bark used for tanning.

**Carapate**. Tree about 2 feet in diameter; used for rafters, beams, posts, etc.

**Raisin Montagne**. Tree; 2 feet in diameter, used for light work in house building; not durable.

**Logwood or Campeche** (*Haematoxylon campechianum*). Dye wood, used for posts; very durable cabinet wood.

**Sapodilla** (*Achras Sapota*). Fruit tree, grows to a considerable size; furniture wood, employed for inside house work; not lasting.

**Acajou grande feuille** (*Guarea* sp.). Large tree, timber employed for all kinds of inside house work.

**Acajou blanc**. Tree about 3 or 4 feet in diameter, makes excellent boards for inside house work.

**Acajou Montagne**. Large tree, 2 to 3 feet in diameter, employed for house building, furniture wood, shingles; not very hard, but bears moisture well.

**Bois Serpent**. Tree 3 to 4 feet in diameter, useful timber for any purpose, shingles, posts, oars, house building, mill frames, rafters, etc.

**Bois graine blue** (*Symplocos martinicensis*). Tree about 2 feet in diameter, sawn into boards and planks, and used for inside house work.

**Bois Riviere** (*Chimarrhis cymosa*). Large tree, timber used for indoor work, and furniture wood.

**Pommier**. Large tree, 4 or 5 feet in diameter; employed for staves, rafters, and inside house work; not a durable wood.

**Sureau Montagne** (*Turpinia occidentalis*). Large tree, sawn into boards and planks, used for ordinary purposes.

**Chataignier grande feuille** (*Sloanea Massoni*). Large tree, 5 or 6 feet in diameter; timber used for mill rollers, inside house work; becomes hard when dry.

**Chataignier petite feuille** (*Sloanea* sp.). Used as the above species.

**Chataignier cocoa**. Valuable timber, employed for mill rollers, posts, etc.

**Chataignier Noir** (*Trichilia simplicifolia*). Tree 2 or 3 feet in diameter; sawn into boards and planks, used in house building and for mill rollers.

**La Glu or Bois de Soie**. Middle-sized tree, timber used only for inside work.

**Bois Pistolet** (*Guarea Perrottetiana*). Large tree, 3 or 4 feet in diameter; valuable furniture wood, used in inside and outside work.

**Mapou** (*Cordia reticulata*). Wood employed for making staves; of little value.

**Mapou grande feuille**. Sawn into planks for house building, staves.

**Mapou petite feuille**. Wood used for staves.

**Bois Ciceron or Pipurie** (*Pithecolobium micradenium*). Large timber tree; made into staves and shingles, boards, planks.

**Gueppois grande feuille**. Small tree, used for posts and walking sticks.

**Mahoe-Piment** (*Daphnopsis tinifolia*, Meissn). Small tree, used for posts; wood of little value, bark employed for making rope.

**Mahoe-Cochon**. Large tree, 3 to 4 feet in diameter, used for staves and boards; wood splits very easily.

**Bois Dubarre**. Hard-wood tree, used for posts, rafters, beams, etc.; also for mill work.

**Commentin** (*Myrcia divaricata*). Hard-wood tree, employed for beams, rafters, posts, etc.; the Caribs mix the expressed juice of the bark with Roucou, for the purpose of colouring and polishing other woods.

**Moricypre** (*Byrsonima spicata*). Tree about 2 feet in diameter; useful timber for house building and cabinet work.

**Kaklin**. Hard-wood tree, 12 to 16 inches in diameter; durable wood for house work, posts, etc.; lasts well in water; makes excellent charcoal.

**Acomat blanc**. Tree 3 or 4 feet in diameter, employed for house work, posts, rafters, etc.; only used for inside work.

(To be continued.)



## MARKET REPORTS.

London,—October 1, 1907. 'THE WEST INDIA COMMITTEE CIRCULAR,' Messrs. KEARTON, PIPER & Co.; September 20, Messrs. E. A. DE PASS & Co.; 'THE LIVERPOOL COTTON ASSOCIATION WEEKLY CIRCULAR,' September 27, 1907.

ARROWROOT—St. Vincent,  $2\frac{1}{2}d.$  to  $2\frac{3}{4}d.$  per lb.  
 BALATA—Sheet,  $\frac{2}{3}$  to  $\frac{2}{7}$ ; block,  $\frac{1}{8}$  to  $\frac{1}{10\frac{1}{2}}$  per lb.  
 BEES'-WAX— $\pounds 7$  10s. per cwt.  
 CACAO—Trinidad,  $84\frac{1}{2}$  to  $112\frac{1}{2}$  per cwt.; Grenada, 118s. 6d. to 121s. 6d.; Dominica, 112s. to 120/-; Jamaica, 105s. 6d. to 117s.; Demerara, 120/- per cwt.  
 CHILLIES—Japanese; fair large red and yellowish, 19/- to 20/-; Zanzibar and Mombasa mixed, 17/6 to 20/-; Sierra Leone, 28/6 per cwt.  
 COFFEE—Jamaica,  $48\frac{1}{2}$  to  $57\frac{1}{4}$ /-; Santos,  $30\frac{7}{8}d.$  per cwt.  
 COPRA—West Indian,  $\pounds 22$  per ton.  
 COTTON—St. Kitt's,  $18\frac{1}{2}d.$  to  $21d.$ ; St. Thomas,  $22d.$ ; Montserrat,  $19d.$ ; Antigua  $19\frac{1}{2}d.$  to  $23d.$ ; Barbados,  $18d.$  to  $21d.$ ; Nevis,  $18\frac{1}{2}d.$  to  $19d.$  per lb.  
 FRUIT—  
 BANANAS—Jamaica, 4/- to 5/- per bunch.  
 PINE-APPLES—St. Michael,  $\frac{2}{6}$  to  $\frac{4}{6}$  each.  
 GRAPE FRUIT,  $\frac{16}{6}$  to  $\frac{24}{-}$  per box.  
 ORANGES—Jamaica,  $\frac{13}{6}$  to  $\frac{16}{-}$  per box.  
 FUSTIC— $\pounds 4$  5s. to  $\pounds 4$  15s. per ton.  
 HONEY—20s. to 28s. per cwt. for dark liquid to yellowish.  
 ISINGLASS—West India lump,  $\frac{1}{10}$  to  $\frac{2}{-}$  per lb.; cake, no quotations.  
 LIME JUICE—Raw,  $\frac{1}{1}$  to  $\frac{1}{5}$  per gallon; concentrated,  $\pounds 24$  5s. per cask of 108 gallons; Distilled Oil, 2s. 9d. to 2s. 10d. per gallon; hand-pressed, 4/- to  $\frac{4}{2}$  per gallon.  
 LOGWOOD— $\pounds 4$  4s. to  $\pounds 4$  15s. per ten; Roots, no quotations.  
 MACE—Fair to good red,  $\frac{1}{-}$  to  $\frac{1}{1}$ ; fair pale and reddish,  $\frac{1}{2}$ ; broken,  $10\frac{1}{2}d.$  per lb.  
 NUTMEGS—63's to 64's;  $\frac{1}{2}$  to  $\frac{1}{4}$ ; 67's to 70's, 9d. to  $9\frac{1}{2}d.$ ; 73's to 74's,  $7\frac{1}{2}d.$  to 9d.; 78's to 86's, 7d. to 8d.; 87's to 91's,  $5\frac{1}{4}d.$  to  $6\frac{1}{2}d.$ ; 92's to 98's, 5d. to 6d.; 100's to 111's,  $4\frac{1}{2}d.$  to  $5\frac{1}{2}d.$ ; 112's to 117's,  $4\frac{1}{4}d.$  to  $4\frac{3}{4}d.$ ; 118's to 124's, 4d. to  $4\frac{1}{2}d.$ ; 125's to 142's,  $3\frac{1}{2}d.$  to  $4\frac{1}{2}d.$ ; 146's to 157's,  $3\frac{1}{4}d.$  to  $3\frac{3}{4}d.$   
 PIMENTO—Fair,  $3\frac{1}{8}d.$  per lb.  
 RUBBER—Fine hard Para,  $4\frac{5}{8}d.$  to 4s  $6\frac{1}{2}d.$ ; soft fine,  $4\frac{5}{8}d.$  to 4s.  $5\frac{1}{2}d.$  per lb.  
 RUM—Jamaica, common,  $\frac{2}{7}$ ; good, 2s. 10d.; Demerara,  $\frac{1}{0\frac{1}{2}}$  to  $\frac{1}{2}$  per proof gallon.  
 SUGAR—Crystals, 18/-; Muscovado, no quotations; Molasses, no quotations.

Montreal,—August 9, 1907.—Mr. J. RUSSELL MURRAY.  
 (In bond quotations, c. & f.)

COCOA-NUTS—Jamaica,  $\$32\cdot00$ ; Trinidad,  $\$29\cdot00$  per M.  
 COFFEE—Jamaica, medium, 10c. to 12c. per lb.  
 GINGER—Jamaica, unbleached, 15c. to 16c. per lb.  
 MOLASSES—Antigua, 19c.; Barbados, 22c. to 23c. per Imperial gallon.  
 NUTMEGS—Grenada, 16c. to 17c. per lb.  
 PIMENTO—Jamaica, 6c. to  $6\frac{1}{2}c.$  per lb.  
 SUGAR—Grey crystals, 96°,  $\$2\cdot50$  per 100 lb.  
 —Muscovados, 89°,  $\$2\cdot06$  per 100 lb.  
 —Molasses, 89°,  $\$1\cdot80$  per 100 lb.

New York,—October 4, 1907.—Messrs. GILLESPIE BROS. & Co.

CACAO—Caracas, 26c. to 27c.; Grenada,  $25\frac{1}{2}c.$  to  $26\frac{1}{2}c.$ ; Trinidad,  $25\frac{1}{4}c.$  to  $26\frac{1}{4}c.$ ; Jamaica, 24c. to 25c. per lb.  
 COCOA-NUTS—Jamaica, select,  $\$30\cdot00$  to  $\$32\cdot00$ ; culls,  $\$18\cdot00$  to  $\$20\cdot00$ ; Trinidad,  $\$28\cdot00$  to  $\$31\cdot00$ ; culls,  $\$17\cdot00$  to  $\$19\cdot00$  per M.  
 COFFEE—Jamaica ordinary,  $7\frac{1}{4}c.$  to  $7\frac{3}{4}c.$ ; good ordinary,  $7\frac{1}{4}c.$  to  $7\frac{3}{4}c.$ ; good washed, 11c. to  $11\frac{1}{2}c.$  per lb.  
 GINGER—Small to bold scraggy root,  $14\frac{1}{4}c.$  to  $15\frac{1}{2}c.$ ; small

to bright bold,  $15\frac{1}{2}c.$  to  $16\frac{1}{2}c.$  per lb.  
 GOAT SKINS—Jamaica, 50c.; St. Kitt's, Antigua, and St. Thomas, 43c. to 48c.  
 GRAPE FRUIT—Jamaicas,  $\$4\cdot00$  to  $\$9\cdot00$  per barrel;  $\$3\cdot00$  to  $\$5\cdot00$  per box.  
 LIMES— $\$3\cdot50$  to  $\$5\cdot25$  per barrel.  
 MACE—30c. to  $35c.$  per lb.  
 NUTMEGS—110's,  $11\frac{1}{4}c.$  to  $12\frac{1}{4}c.$  per lb.  
 ORANGES—Jamaica,  $\$2\cdot25$  to  $\$2\cdot75$  per box;  $\$5\cdot00$  to  $\$6\cdot00$  per barrel.  
 PIMENTO— $6\frac{1}{2}c.$  per lb.  
 SUGAR—Centrifugals, 96°, 3·95c.; Muscovados, 89°, 3·45c.; Molasses, 89°, 3·09c. per lb., duty paid.

## INTER-COLONIAL MARKETS.

Barbados,—Messrs. JAMES A. LYNCH & Co., October 15, 1907; Messrs. T. S. GARRAWAY & Co., October 12, 1907.

ARROWROOT—St. Vincent,  $\$4\cdot50$  per 100 lb.  
 CACAO—Dominica,  $\$22\cdot00$  per 100 lb.  
 COCOA-NUTS— $\$22\cdot80$  per M. for husked nuts.  
 COFFEE—Jamaica,  $\$9\cdot50$  to  $\$10\cdot50$  per 100 lb.  
 HAY— $\$1\cdot60$  to  $\$1\cdot80$  per 100 lb.  
 MANURES—Nitrate of soda,  $\$62\cdot00$  to  $\$65\cdot00$ ; Ohlendorff's dissolved guano,  $\$55\cdot00$ ; Cotton manure,  $\$42\cdot00$ ; Cacao manure,  $\$42\cdot00$  to  $\$48\cdot00$ ; Sulphate of ammonia,  $\$72\cdot00$  to  $\$75\cdot00$ ; Sulphate of potash,  $\$67\cdot00$  per ton.  
 ONIONS—Madeira,  $\$2\cdot00$  to  $\$2\cdot25$  per 100 lb.  
 POTATOS, ENGLISH— $\$2\cdot00$  to  $\$2\cdot25$  per 160 lb.  
 PEAS—Split,  $\$5\cdot85$  to  $\$6\cdot00$ ; Canada,  $\$3\cdot15$  per bag.  
 RICE—Demerara,  $\$5\cdot50$  to  $\$5\cdot75$  (177 to 180 lb.); Patna,  $\$3\cdot65$  to  $\$4\cdot00$ ; Rangoon,  $\$2\cdot86$  to  $\$3\cdot10$  per 100 lb.  
 SUGAR—Yellow crystals,  $\$3\cdot75$  per 100 lb.

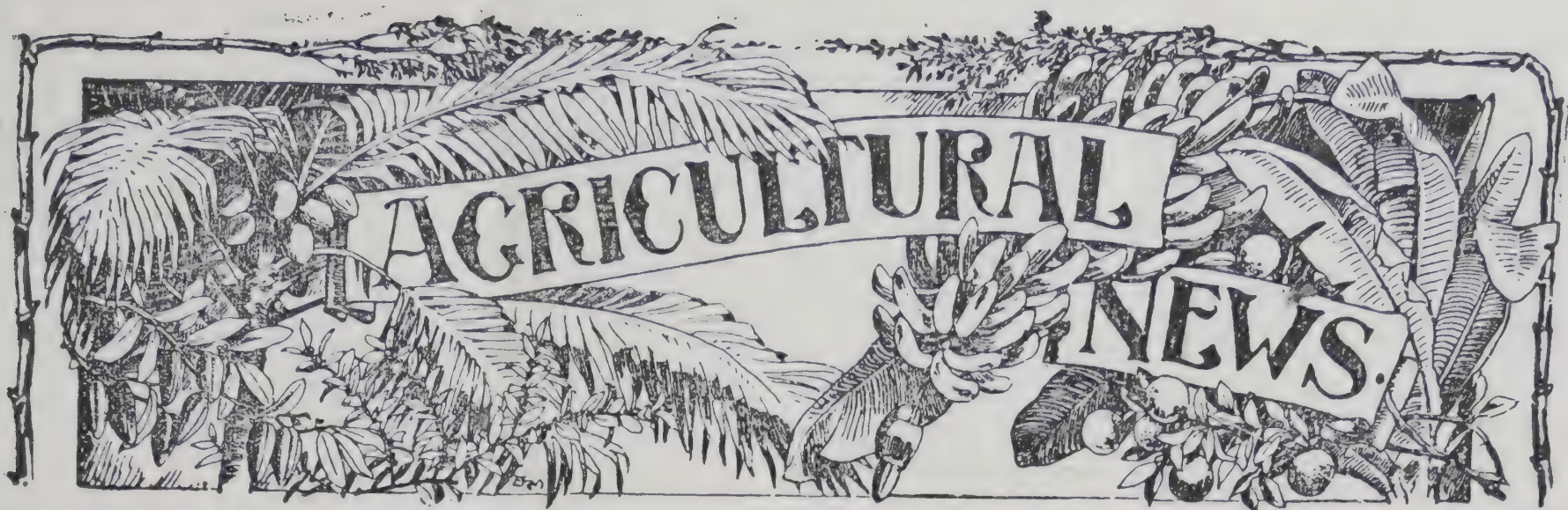
British Guiana,—October 5, 1907.—Messrs. WIETING & RICHTER.

ARROWROOT—St. Vincent,  $\$10\cdot00$  to  $\$12\cdot00$  per barrel.  
 BALATA—Venezuela block, 32c.; Demerara sheet, 48c. per lb.  
 CACAO—Native, 16c. to 17c. per lb.  
 CASSAVA—No stock.  
 CASSAVA STARCH— $\$9\cdot00$  per barrel.  
 COCOA-NUTS— $\$12\cdot00$  to  $\$16\cdot00$  per M.  
 COFFEE—Creole, 13c. to 14c.; Jamaica, 12c. per lb.  
 DHAL— $\$4\cdot90$  to  $\$5\cdot15$  per bag of 168 lb.  
 EDDOS— $\$1\cdot20$  to  $\$1\cdot44$  per barrel.  
 MOLASSES—18c. to 19c. per gallon.  
 ONIONS—Madeira,  $1\frac{1}{2}c.$  to  $2\frac{1}{2}c.$  per lb.  
 PLANTAINS—20c. to 48c. per bunch.  
 POTATOS,—Madeira,  $\frac{3}{4}c.$  to 1c. per lb.  
 POTATOS, SWEET—Barbados,  $\$1\cdot92$  per bag.  
 RICE—Creole,  $\$4\cdot75$  to  $\$5\cdot00$  per bag; Seeta,  $\$6\cdot00$  per bag.  
 SPLIT PEAS— $\$6\cdot25$  per bag (210 lb.).  
 TANNIAS— $\$2\cdot52$  per bag.  
 YAMS—White,  $\$3\cdot00$ ; Buck,  $\$2\cdot40$  to  $\$3\cdot36$  per bag.  
 SUGAR—Dark crystals,  $\$2\cdot07\frac{1}{2}$  to  $\$2\cdot55$ ; Yellow,  $\$2\cdot90$  to  $\$3\cdot10$ ; White,  $\$3\cdot60$  to  $\$4\cdot00$ ; Molasses,  $\$1\cdot80$  to  $\$1\cdot90$  per 100 lb. (retail).  
 TIMBER—Greenheart, 32c. to 55c. per cubic foot.  
 WALLABA SHINGLES— $\$3\cdot50$  to  $\$5\cdot50$  per M.

Trinidad,—October 5, 1907.—Messrs. GORDON, GRANT & Co.

CACAO— $\$26\cdot00$  to  $\$27\cdot00$  per bag; Venezuelan,  $\$26\cdot60$  per fanega.  
 COCOA-NUTS— $\$21\cdot00$  to  $\$22\cdot00$  per M., f.o.b.  
 COCOA-NUT OIL— $\$1\cdot05$  per Imperial gallon (cask included).  
 COFFEE—Venezuelan, 7c. to  $7\frac{1}{2}c.$  per lb.  
 COPRA— $\$3\cdot75$  per 100 lb.  
 DHAL— $\$4\cdot40$  to  $\$4\cdot60$  per 2-bushel bag.  
 ONIONS— $\$1\cdot50$  to  $\$2\cdot00$  per 100 lb. (retail).  
 POTATOS, ENGLISH— $\$1\cdot00$  to  $\$1\cdot10$  per 100 lb.  
 RICE—Yellow,  $\$5\cdot60$  to  $\$5\cdot75$ ; White,  $\$5\cdot50$  to  $\$6\cdot65$  per bag.  
 SPLIT PEAS— $\$5\cdot50$  to  $\$5\cdot75$  per bag.  
 SUGAR—Grocery grades,  $\$5\cdot00$  to  $\$5\cdot25$  per 100 lb.





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## Mechanical Tillage.

**I**NTERESTING and important develop-  
ments are in progress at Antigua in  
connexion with the introduction of imple-  
ments to supplement hand work in tilling and weeding.

Two complete sets of Fowler's steam ploughs and  
accessories were introduced on two separate groups of  
Estates in 1906. Experience had been made of imple-  
ments of this class from the early sixties, and their use

was continued up to about 1890; for some years how-  
ever, steam ploughs have not been in use in the island.  
The function of these ploughs is to enable cultivation  
to be carried on at the most favourable periods of the  
year, and to permit of deeper tillage than is possible  
with ploughs drawn by animals.

The re-introduction of steam ploughs is, in itself,  
of interest, but the development to which attention is  
now more particularly drawn is in the direction of  
using light mule-drawn implements for weeding and  
surface tillage in place of hoes and forks.

Late in 1906, Messrs. Henckell, Du Buisson, & Co.  
introduced a number of American implements, and,  
under the direction of one of their managers who had  
visited Louisiana, assisted by an expert from that  
State, commenced the cultivation of a considerable  
area of land for canes on lines involving the minimum  
of hand labour: the work has now been in progress  
a sufficiently long time to admit of attention being  
drawn to the results already achieved.

The land was ploughed in some cases by steam, in  
other cases by cattle ploughs, after which it was thrown  
into ridges by means of mule-drawn implements. For  
this purpose several implements are alternatively used.  
These may be either a double mould-board plough on  
wheels with adjustable mould boards, or a single  
mould-board plough, or a disc turn-plough, as may be  
most convenient.

The ridge so made is kept in tilth and weeded by  
means of disc cultivators, which form the ridges into  
good shape while stirring the soil and destroying  
weeds; or a 'walking cultivator,' drawn by two mules,  
may be used. The hollows between the ridges known



as 'middles,' are weeded and deepened by a light double mould-beard plough known as a 'middle burster.' The weeding of the middles is also accomplished by means of the 'walking cultivator' which has adjustable wheels, gangs, and shovel points, enabling it to work either on banks or in furrows.

Thus by means of implements the land is ploughed, ridged or banked, cultivated and weeded up to the time the canes are to be planted without recourse to hand labour.

In order that the implements should pass freely over the land, the system of draining requires consideration. Deep open drains are dug at suitable distances according to the nature of the land; these may be from 30 feet to 100 feet apart: they run parallel with the ridges and thus are not crossed by the implements\*: shallow drains known as 'quarter-drains' cross the ridges or furrows at right angles, and deliver any surplus water into the main drains. This is the point where local opinion feared the system would break down, for it was anticipated that the 'quarter-drains' would prove insufficient. It is satisfactory, however, to note that they appear to answer their purpose admirably, and doubts on this point are rapidly disappearing. Any small quantity of mould thrown by the implements into the 'quarter-drains' is removed by small pony plough or by hand. This calls for little effort.

Contrary to the practice common in the island, where the canes are planted in the furrow, the canes in the new system have been planted on the ridge. To effect this a slight furrow is opened on the top of the ridge by means of one of the implements, such as the 'middle-burster' or the pony plough, and pieces of cane are laid flat in the furrow so formed. These are covered either by the light pony plough, the 'walking cultivator,' or by the disc cultivator. A light rolling or trampling suffices to press the mould closely around the cane. The young canes thus spring from the top of the low ridge, and the animals drawing the implements walk in the furrows or 'middles.'

The cane being planted, the whole surface of the field is kept gently stirred by suitable implements, of which there is a somewhat large choice. The 'walking cultivator,' drawn by two mules, may be made to stir the surface either of the ridge or furrow, or the disc cultivator may be employed, or the orchard harrow may be used for the furrows. Several of these implements are adjustable so that they will turn the mould in either direction as desired, will form a ridge or flatten one down.

By means of the implements the soil may be kept

\*These drains are made by hand.

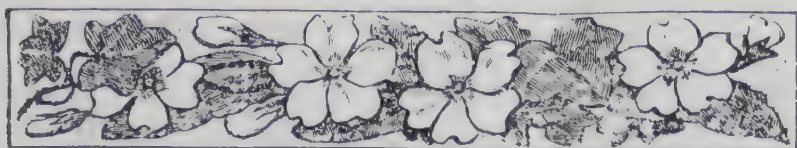
thoroughly stirred and weeded, so that weeds are effectually kept down, except a few which make their appearance on the top of the ridge between the young cane shoots. Most of these can be covered by the mould thrown up by the implements, but here and there it may be necessary to have recourse to the hoe. The implements will work over and between the canes until the latter have grown to a height of 2 or 3 feet.

Beyond the effect of weeding, a most important result follows from the ability to stir the whole surface of the soil to a depth of 2 or 3 inches. This forms what is known as a dust mulch, and constitutes a most important means of conserving soil moisture. That this effect does result was demonstrated a short time ago when, at the end of a long dry spell, samples of soil were taken from two adjacent spots, both under young canes, one of which had been worked under the old system, and the other under the new: the samples were taken from (a) the surface, (b) 5 inches deep, and (c) 15 inches deep. The surface soil under the new system contained 2 per cent. less moisture than that under the old, but at 5 inches deep there was 5 per cent. more moisture, and at 15 inches over  $5\frac{1}{2}$  per cent. more. The significance of this will be seen when it is remembered that 5 per cent. of moisture is approximately equal to 1 inch of rain in a foot of soil. In other words, at the end of the dry period the soil cultivated under the new system had an advantage over that treated under the old, equal to an inch of rain, and moreover, had had the continuous benefit of the additional moisture throughout the whole period.

While this development has been in progress, important changes have taken place in connexion with the labour supply. Where formerly labour was abundant and it was sometimes difficult to find work for labourers, now, with the expansion of agricultural effort in the direction of cotton growing, and of the cultivation of canes by the peasantry for sale to the factories together with the depletion of the labour supply by emigration, there is considerable difficulty in finding sufficient hands. A method which permits of the cultivation of the fields, and the raising of a crop by the use of implements proves most acceptable, and, apart from its other advantages, will commend itself to planters, and already there is evidence that the system will soon be quite widely adopted.

The system lends itself admirably to cotton cultivation; indeed, it is hardly too much to say that cotton growing in Antigua will soon be dependent on the introduction of implemental tillage.





## SUGAR INDUSTRY.

### Sugar-Cane Experiments at Barbados.

The official report on the sugar-cane experiments carried on in Barbados under the direction of the Imperial Department of Agriculture, during the season 1904-6, has recently been issued. It will be remembered that a paper, giving the most important and interesting points in connexion with the work of the season, was presented to the Barbados Agricultural Society in November last by Professor d'Albuquerque and Mr. J. R. Bovell, compilers of the official report, and that a summary of this paper appeared in the *Agricultural News* (Vol. V, p. 369).

Part I of the report gives the amount and composition of Barbados rainfall, this having been measured at Dodds Botanic Station. During the season under consideration, from December 1904, to May 1906, the rainfall was 54.41 inches, as compared with 82.57 inches and 103.62 inches respectively in the two previous seasons.

In part II of the report an account is given of the results of the manurial experiments which are in progress on seven estates in the island. The chief results, carefully summarized, are presented at the beginning of the report, the fuller details, in tabular form, being given in the latter half of the book. The results so far, go to show that, generally, addition of artificials to an ordinary application of farm-yard manure gives a larger yield of sugar than would be obtained by the application of increased quantities of farm-yard manure. The beneficial results of nitrogen, both to plant canes and ratoons, were also very evident.

The third part of the report deals with the results for the season of the trials of seedling and other varieties of cane, which have now been carried on for nine years in Barbados. The experiment plots are situated on thirteen estates, typical of the different soils of the island, eleven being on black soils and two on red. As with the manurial trials, a summary of the results, for general readers, appears at the beginning, the tabulated details being given at the end. Canes D. 95, B. 1,529, B. 147, and D. 1,438 did best on the black soils as plant canes; and on red soils, as plants and ratoons, the best results were given by B. 1,566, B. 376, D. 95, and B. 208.

### Sugar-cane Deterioration and Seedling Canes.

From a brief article relating to the deterioration of the sugar-cane in Mexico, which appeared in the September number of the *Mexican Investor*, the following note has been taken:—

Every sugar man must acknowledge that Mexico offers unusually favourable conditions for the growing of sugar-cane. But no one who has the real knowledge of sugar growing, and of the results this industry ought to produce, can avoid seeing that the industry in Mexico is not what it ought to be. There are many reasons for this. One, and probably the most important one, is that the varieties grown in this country are deteriorating. A plant grower or a botanist knows well that there are many cases with evidence of deterioration in vegetatively reproduced plants. Until the

last few years the sugar-cane was invariably propagated by non-sexual or vegetative methods.

The cultivation has been carried on in widely varying conditions of soil, climate, and exposure. Yet the deterioration has been complained of in every part where its cultivation is of importance. In countries such as Hawaii, Java, British Guiana, and the West Indies, new seedling varieties have been developed, and the results obtained bear ample testimony as to the wisdom of such a course. It is time that Mexican sugar planters realized the necessity of a similar action. With due attention paid to the application of fertilizers, and with modern methods in the sugar house there is not the slightest doubt that Mexico will rank among the best sugar-producing countries in the world, and its planters will make more money.

### Big Sugar Enterprise in Colombia.

The British Vice-Consul at Cartagena, in his latest report, gives the accompanying particulars as to the establishment of a large sugar plantation and refinery in that district:—

A very important sugar-cane plantation and refinery establishment, named the Colombia, is in course of active construction by Messrs. Velez Danies, & Co., of this city, in a place called Sincerin, about 28 miles distant from the town. The lands of Sincerin have been pronounced by experts to be equal to those of Cuba. An experienced engineer is already in charge, and 600 men are said to be actually employed there planting the cane etc. The enterprise is strongly supported with money (£30,000) and privileges by the Government, which will no doubt greatly contribute to its successful development in a very few years. The whole of the machinery, which is to be provided with all the latest improvements in use by modern Cuban sugar estates, is to be bought in Glasgow. The concession stipulates that the production of sugar shall be not less than 2,600,000 lb. per crop. The total cost of the enterprise is estimated at about £160,000. It is calculated that 1,000 men will find permanent employment in this sugar factory when the whole plant is running regularly.

### Crude Sugar Production in Mexico.

In the *Hawaiian Planters' Monthly* for August last there appears a short article describing the production of crude brown sugar which is extensively practised in Mexico.

In the manufacture of this product the cane juice is boiled down until it reaches a syrupy consistency. It is then evaporated over a fire, and finally poured into moulds, and allowed to solidify. No clarifying or refining process is attempted.

This crude brown sugar is known either as panocha, panela, or piloncillo, according to the particular shape of the cakes in which it is made. These cakes are usually of a dark honey colour.

The producers of this form of sugar are usually small farmers who cannot afford a modern sugar-refining plant. The maximum production for each planter is said to be about 25,000 lb. annually.

The average price obtained for this crude product varies from 50c. to 63c. (U.S. currency) per 25 lb. This sugar is largely used in the manufacture of spirits, and it seems to be an article of barter throughout the republic.

There has been a quantity of this crude sugar exported to the United States, where it is stated to be used in the confectionery trade.





## WEST INDIAN FRUIT.

### JUICE FROM SOUR ORANGES AND BITTER-SWEET ORANGES.

On some estates in Dominica numbers of sour and of bitter-sweet orange trees are growing wild. The fruits yield orange oil, of which small quantities are exported yearly. During 1906, 36 gallons of orange oil, valued at £60, were exported. Recently inquiry was made as to whether the juice of these oranges could not be mixed with lime juice, and concentrated for the sake of obtaining the citric acid in it. In order to investigate this matter ripe fruits of the sour orange and the bitter-sweet orange were sent to the Government Laboratory, Antigua, for the juice to be tested. \* The following report by the Hon. Dr. Watts will be of considerable interest to lime planters:—

Specimens of sour oranges and bitter-sweet oranges were forwarded to this Laboratory in order that an opinion might be given as to the desirability of mixing the juice of these oranges with lime juice intended for concentration.

It is to be observed that the fruits were fully ripe.

The results of the examination are as follows:—

	JUICE FROM	
	SOUR ORANGES.	BITTER-SWEET ORANGES.
Per cent. of juice by weight from fruit	10.7	16.3
Specific Gravity of juice	1.0357	1.0308
Total solid matter per 100 c. c.	10.25 grams	8.98 grams.
Total solids per gallon	16.4 oz.	14.2 oz.
Acidity calculated as citric acid per gallon	3.57 oz.	0.9 oz.
Coefficient of purity	21.8	6.2

From the above figures it is evident that it would be disadvantageous to use the juice of ripe bitter-sweet oranges for concentration. The amount of acid is insignificant while the amount of other matter in solution is large. Each gallon of such juice would bring with it over 13 oz. of impurities and less than 1 oz. of acid.

It would not be worth while to use such juice for the preparation of citrate of lime.

The sour orange juice contains rather more acid, but it also contains a large amount of soluble matter other than acid, nearly 13 oz. per gallon. Such juice is not suitable for concentration, for if concentrated 8 to 1, and no loss took place in the process, it would contain 131 oz. of solid matter

per gallon, but only 28½ oz. of citric acid. Probably such a juice would burn badly in concentrating, and would yield an undesirable product. If mixed with lime juice its objectionable features would only be disguised, and not eliminated.

It may perhaps be worth while to attempt to prepare citrate of lime from such juice before concentration, as in that manner citric acid may be recovered; but it is anticipated that more difficulty will be experienced in preparing citrate from such a juice than is met with in making it from lime juice owing to the difference in purity.

In view of the small quantity of juice, and of acid in these fruits, it is questionable if their value will pay for the cost of collecting; this question can only be decided locally, for it may happen that the essential oil which they contain has a market value.

### BANANAS FROM HAWAII.

Bananas are produced in large quantity in Hawaii, and about 15,000 bunches per month are shipped from thence to San Francisco. The fruits are of the Chinese or Cavendish variety, and are reported to be of excellent flavour. A distinct variety, known as the 'cooking banana' is also grown in small quantity, and has been exported. The following reference to this type of banana is taken from bulletin No. 14 of the Hawaii Agricultural Experiment Station, 'Marketing Hawaiian Fruits':—

The cooking banana is in its use so unlike the banana which is eaten without cooking, as to be quite a distinct product upon the market. During the past twenty years, as has been seen, a large trade has been built up in the banana which is eaten raw. The cooking banana which takes the place of fresh vegetables and cooking fruit has not yet been introduced to the American markets, except in New Orleans and about the Gulf Coast. There can be no doubt that during the winter season when there is a lack of fresh vegetables in the markets, there would be large demand for the cooking bananas that are grown in a small way in Hawaii. The merits of the Hawaiian cooking bananas are but little understood, even by a large number of people who have resided in islands for a considerable period. To the people of the mainland they are practically unknown. Active efforts to introduce and acquaint the people with this fruit would probably result in building up a large trade in the product.

\* For comparison it may be stated that lime juice contains from 12 to 14 oz. of citric acid per gallon of juice.



## LIME INDUSTRY IN ST. LUCIA.

The Imperial Commissioner of Agriculture has received the following letter from Mr. J. C. Moore, Agricultural Superintendent of St. Lucia:—

You will be interested to learn that the first shipment of concentrated lime juice has recently been made from this island. The juice was prepared on Fond Devauz estate which possesses the pioneer lime plantation in St. Lucia. The factory is being completed on modern lines, the juice being concentrated by steam in wooden vats, and granite rollers are shortly to be fitted up.

Lime planting is still progressing in various parts of the island; over 40,000 plants have been distributed from the Department nurseries during the past six months, and considerable numbers are grown in private nurseries on estates.

The plants are very hardy, and the trees thrive remarkably well here, and if the plantations now being started are properly looked after, limes and lime juice may soon become items of considerable importance in our exports. I am confident that limes and lime juice equal to any in the world can be produced in St. Lucia.

## SHIPPING ORANGES: CAUSES OF DECAY.

In consequence of the large numbers of oranges that arrive in the Eastern States of America from California in a decayed condition, the United States Department of Agriculture has been making an investigation of the causes of loss. The following conclusions, arrived at as the result of the enquiry, emphasize the importance of special care in gathering, handling, and packing oranges, as described in the last issue of the *Agricultural News*, (Vol. VI, p. 325):—

The loss from decay in oranges in 1905 amounted to \$1,000,000 or more. The decay is caused by a common mould which usually enters the fruit through an abrasion in the skin, or else enters an orange that has had its resisting power weakened in some other manner. More than half the decay in the eastern markets can be readily traced to mechanical injuries in the skin of the fruit. Moist warm air provides ideal conditions for the growth of the mould and consequent decay. Cold or dry air may prevent the germination of the mould spores, and retard the development of the disease, if this has already started.

The average injury from cutting the fruits with the clippers or shears, in severing them from the tree, has been about 5 to 8 per cent. in 1906. In 1905, it averaged 15 to 20 per cent. The injury seems to be reduced to a minimum when the picking is done by trained gangs of men under the control of the packing house, or when the packing house employs an inspector to guard the different growers against this type of injury. The injury appears to be more common when the fruit is picked by the box, and when the pickers are not under careful supervision. The oranges delivered at a packing house show great differences as to the number injured by the clippers. In some cases the number is as small as 1 per cent.; in other cases it is as much as 40 per cent. A similar variation is common in the fruit picked by different men in the same grove.

Another cause of injury and source of decay of the fruit, is that due to leaving too long a stem when gathering the oranges. The damage that may be brought about as a result, on pouring from one receptacle to another, is obvious.

## AGRICULTURE IN SIERRA LEONE.

Although little has yet been done to develop the agricultural resources of Sierra Leone, the latest *Annual Report* on the Protectorate states that a beginning has been made by the establishment of a Government Experiment Farm, with a view of demonstrating the best methods of cultivating the crops suitable to the country. At present, apart from the kola tree, which is found near almost every village, and from the produce of which a considerable portion of the revenue of the native inhabitants is derived, the chief crops grown consist of rice and cassava. Ginger is also grown as an article of export, but there are no plantations of permanent crops such as cacao and cocoa-nuts, for the growing of which it is stated that certain parts of Sierra Leone appear to be admirably adapted.

The primitive condition of the agricultural industry in the Protectorate will be realized from the fact that the people, after growing a crop of rice, were in the habit of allowing the land to revert to bush for seven years, being under the opinion that this was necessary before another crop could be yielded. However, deep soil cultivation has been introduced, a suitable rotation of crops has been started, the land being kept constantly in cultivation, and as a result, the yields of rice obtained have largely improved, both in quantity and quality.

Efforts have been made in many parts of the Protectorate to induce the natives to adopt the deep soil system of cultivation, and for this purpose a large number of agricultural implements were imported during the year and distributed to many chiefs.

Experiments have also been conducted at the Government farm with a view to instructing the people in the best methods of growing and preparing ginger, and the enhanced prices which have been obtained for this product are very encouraging.

A little coffee of excellent quality is also reported to be produced in the colony. Valuable fibre-producing plants, indigenous to the country, grow in large quantity, and the produce is already becoming an article of commerce on a small scale.

The oil-palm (*Elaeis guineensis*) is very prominent among the vegetable products of Sierra Leone, the shipments of palm-kernels forming 62·8 per cent. of the exported produce of the colony.

During 1906, 20,373 tons of palm-kernels having a value of £330,427, were shipped abroad as compared with 28,155 tons, valued at £269,355, in 1905, and 25,101 tons, valued at £213,731, in 1904. Palm oil in large amount is also exported, the quantity shipped in 1906 being 375,573 gallons, having a value of £27,744. This was an increase of 109,562 gallons in quantity, and £9,220 in value, over the figures for the previous year.

Kola nuts to the extent of 1,155 tons, valued at £104,084 were shipped abroad during 1906, this being about 50 per cent. in excess of the annual exports of the previous four years, during which period they were practically stationary.

Rubber has also been an article of export from the colony of late years, but only in small quantities, the amount shipped in 1906 being 107 tons, as compared with 190 tons in 1905.

Cotton is grown on a small scale by the natives, 39 tons having been exported during 1906.





### WEST INDIAN COTTON.

Messrs. Wolstenholme & Holland, of Liverpool, write as follows, under date of October 15, with reference to sales of West Indian Sea Island cotton:—

Since our last report, a very limited business has been done in Sea Island descriptions. Consumers are waiting to see the developments of the market for American Sea Island before operating, prices being still relatively high.

We take this opportunity to impress upon the growers the advantage of shipping in commercial quantities, and not in lots of 1 or 2 bales. Spinners have during the past two or three years purchased single bale lots to oblige us for the encouragement of the industry, but are now refusing to look at retail parcels, with the result that such can only be sold at a distinct discount.

We feel sure it is possible for planters in the same locality to arrange together so that shipments can be made in commercial quantities, as is done in Barbados and St. Vincent.

The sales include Barbados, 19*d.* to 21*d.*; Antigua, 19*d.* to 24*d.*; St. Croix, 18*d.*; and Nevis, 19*d.*; with a few stains.

### COTTON PROSPECTS IN ST. VINCENT.

Mr. W. N. Sands, Agricultural Superintendent of St. Vincent, writing on October 21, sends the following particulars as to the prospects of the present season's cotton crop in the colony:—

I beg to submit a few notes on cotton prospects here which may be of interest. I estimate that there are nearly 3,200 acres planted in Sea Island cotton this season in the colony—which includes several of the Grenadines. I have inspected a good many of the cultivations, and had reports of others, and generally the prospects appear very favourable. The season has been a very good one; the rainfall, which is usually rather too heavy, has been well distributed for the period ended September 30, and has been the lowest since the establishment of the industry. As a result, fungus diseases are not so much in evidence, although the 'anthracnose' disease can be found in nearly every field. From observations it would appear that plants on poor and unsuitable soils, and plants allowed to grow too thickly, suffer the more severely from this cause. This, of course, is what might be expected.

Another extended trial is being given cotton cultivation in the Carib country, and I have recently inspected the cotton growing there. Generally, there is an improvement on previous seasons, but the crops of cotton obtained are still much below an average yield per acre. Each season, however, shows better results. During my visit, the fact

that these soils require a large amount of organic matter was again very forcibly brought to my notice, for on fields heavily manured, and also where leguminous crops such as pigeon peas and ground nuts had been recently grown, the growth and health of the plants was in marked contrast to fields where there was little nitrogenous matter.

The cotton worm has not done much damage, and has been effectively controlled by Paris Green. I have personally given dusting demonstrations on two or three estates where the worm threatened the cultivations. Although the industry has now been established for four years on a large scale, the worm has not become a serious pest.

Cotton picking has been started on several estates and samples of the lint examined appear to be of very good quality and quite up to our usual standard. At the Central Cotton Factory two extra gins have been installed, and other improvements made so as to be able to deal effectively with a much larger crop. Mr. C. J. Simmons has erected a ginnery with three gins to gin the cotton produced on his estates, and his example could now be usefully followed by other growers who plant a large acreage each season.

### SEASONABLE NOTES.

In a short time the middle of the cotton-picking season will have arrived, and it would be advisable if the planters would commence early to make preparations for this work, which it is essential should be carried on in a most careful and painstaking way. It is most important that every detail should be carried out with the utmost care, for at this season the cotton which has taken some months to grow, if not properly dealt with, may be considerably reduced in value.

#### THE COTTON HOUSE.

In the first place the cotton house should receive attention. It should be scrupulously clean, and arrangements should be made for storing the seed-cotton so as to minimise the risk of fire, and of wet, and at the same time to prevent dirt from the labourers' feet being mixed with it. The structure of cotton houses are very varied. In some instances old boiling-houses are used; in others, rooms have been specially built for this purpose, and there are cases where the cotton is stored in the manager's house. What ever method is adopted, the above conditions should be carefully seen to. Another very important point is that the house should be well ventilated. Arrangements should be made to enable the cleaning and sorting of the seed-cotton to be carried on systematically. A good method adopted in St. Vincent is to provide one room of the cotton house specially for the carrying on of this work, and each person



is supplied with a circular woven tray, which is placed upon the knees, and handful after handful of seed-cotton is first whipped upon it and then cleaned. Special cotton cleaning and sorting rooms have also been adopted on some estates in Barbados.

#### WHIPPING FRAMES.

Whipping frames are most useful, and no cotton estate should be without one. A whipping frame is made by stretching  $\frac{1}{4}$ -inch mesh galvanized iron wire netting, over a frame 3 feet long, 2 feet wide, and 6 inches deep. Some of our best planters have all the cotton which is grown on the estate whipped directly after it has been brought into the cotton house. Perhaps it may not be necessary to whip all the cotton, but whenever it is in the least dirty, the whipping process should never be omitted.

#### SUNNING FRAMES.

Frames for sunning cotton are also very necessary appliances on a cotton estate. It is important that no cotton should be stored in the house, or sent to the factory until it is perfectly dry. The length of time required for sunning varies with the season; cotton picked at the beginning of the season requiring a longer period of sunning than that picked later. A sunning frame can be made as follows:—

Make a rectangular frame, 10 feet long by 6 feet wide, of boards 4 inches wide, and 1 inch thick. In the centre of this frame let in another length of material, connecting the two shorter ends. Now, across the top of this frame, at right angles to its length, nail ceiling-laths, leaving  $\frac{1}{2}$  inch spaces between each lath. In place of ceiling-laths  $\frac{3}{4}$ -inch mesh galvanized iron wire netting may be used. The frame will now require a raised edge to prevent the cotton from falling off, and this may be supplied by nailing boards, 12 inches wide, all around. The drier should then be put on wooden horses, 3 feet from the ground, to keep the cotton from the damp, and to allow the air to pass beneath.

#### PICKING BAGS.

A good collection of picking bags should be made ready. The number required will, of course, vary with the acreage planted; no less than one bag for each acre of cotton planted should be on hand. On many estates the bags used in previous years have been mere make-shifts; pieces of old sacking, an apron, or any kind of bag has been used. With well made bags, the labourers can pick more cotton, and pick it better than it is possible for them to do with sacks or other cumbersome articles.

A good bag should be made of canvas, about 18 inches wide, and 2 feet deep with a pocket attached in front about half its size, i.e., about 1 foot by 18 inches. Each bag should also have a strap attached, so as to enable it to hang from the shoulders. This gives freedom to both of the labourers' hands, enabling him or her to do better work.

#### CULTIVATING COTTON FIELDS.

This year Barbados is experiencing a period of very dry weather, so much so that some of the crops may be reduced to an appreciable extent.

During such a season the methods of work adopted on an estate which in a normal season would be entirely satisfactory may have to be considerably modified. In no field should the surface soil be allowed to become caked. Such a state of things would be a means of losing from the ground the little moisture it already holds.

It might be useful if, during the present dry season, planters would try a plan which was last season found very useful by one important cotton planter in this island, viz., the cultivation of the surface soil by means of ordinary garden rakes.

#### MANURIAL VALUE OF COTTON SEED AND COTTON-CAKE MEAL.

*Farmer's Bulletin* 286 describes the results of experiments carried out under the auspices of the United States Department of Agriculture, at McColl, South Carolina, as to the relative merits of cotton seed and of cotton-cake meal for manurial purposes.

This subject was referred to in a brief article in the *Agricultural News*, (Vol. III, p. 393), in which it was stated that the experimental evidence available was in favour of the meal as a manurial agent. Although the oil in the seed delays decomposition, observation does not favour the opinion that plant-growth is retarded by its presence.

The amount of cotton seed used as fertilizer in the United States during 1905 was 1,800,000 tons, this being estimated to contain 72,000,000 gallons of oil, valued at \$18,000,000. If the meal could be shown to be equal in its fertilizing effects to the whole seed, it would demonstrate what an enormous waste was annually involved in the use of the seed, and it was with this idea that the experiments were undertaken. Cotton itself was the crop experimented with, and three separate tests were made, both in 1905 and 1906. Forty bushels of seed to the acre were in the first test compared with 600 lb. of meal, these having been calculated as equivalent quantities; the effect of 30 bushels of cotton seed was also compared with that of 450 lb. of cotton seed, and that of 20 bushels of seed with 300 lb. of meal. The above quantities are probably those most generally used by growers in actual practice. Each experiment plot was an acre in size. Sufficient potash and acid phosphate was in every case added to the seed and the meal to make a properly balanced fertilizer.

The results obtained were decidedly in favour of the cotton-cake meal as against the seed. In 1905, the plot treated with 40 bushels of cotton seed yielded 1,897 lb. of seed-cotton to the acre plot; the plot which had obtained 600 lb. of cotton-cake meal yielded 2,059 lb. of seed-cotton, or an excess of 162 lb. Very similar results were given in the other tests of the same year, in which different quantities of the fertilizers were used. In 1906, the returns were again in favour of the meal, but not to the same extent as in the previous year. The plot treated with 600 lb. of cotton-cake-meal yielded only 78 lb. of seed-cotton over and above that yielded by the plot manured with whole seed, and on the other plots a similar narrowing of the difference in the yields was noticeable.

The writer of the report would attribute the somewhat unequal results obtained in the two years, to the fact that the character of the season would have a considerable influence upon the relative availability of plant food in the seed and in the meal respectively. Considerable moisture is required for the decomposition of the whole seed, and so in a dry season, it does not readily become available as plant food, and the finely pulverized meal has the advantage. In a wet season, on the other hand, the meal tends to become available too quickly, and is likely to be washed out of the soil, and wasted. The season of 1906 was considerably wetter than that of 1905, which corresponds with the explanation put forward.

In the case where 40 bushels of seed were compared with 600 lb. of meal, it is stated that, taking into account the relative market value of meal and seed, the increased yield from the meal, and the value of the oil saved by using meal, there is a difference of \$13.65 per acre in favour of the meal. Another conclusion drawn from the results is that 900 lb. of meal are equivalent in fertilizing value to 1 ton of cotton seed.



## EDITORIAL NOTICES.

Letters and matter for publication, as well as all specimens for naming, should be addressed to the Commissioner, Imperial Department of Agriculture, Barbados.

All applications for Copies of the 'Agricultural News' should be addressed to the Agents, and not to the Department.

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# Agricultural News

VOL. VI. SATURDAY, NOVEMBER 2, 1907. No. 144.

## NOTES AND COMMENTS.

### Contents of Present Issue.

An account is given in the editorial of some interesting experiments in mechanical tillage that have been carried out in Antigua, with good results, for some time past. Further information with reference to the implements that have been employed is given on p. 347.

A review of the official report on the Barbados sugar-cane experiments appears on the Sugar page (339), together with notes on the industry in Colombia and Mexico.

An interesting account of some trials which have been made in Dominica to test the possibility of using the wild oranges which are found there, in connexion with limes, for the preparation of citric acid, is contributed on p. 340. A first shipment of lime juice has been made from St. Lucia, and the character of the produce is such as to promise good prospects for the future.

The cotton prospects of St. Vincent for the present season are reviewed on p. 342. Seasonable Notes also appear, and an article giving results of experiments as to the relative manurial value of whole cotton seed and cotton-cake meal.

Methods for the destruction of cockroaches and ants, which often give trouble as house pests, are described under 'Insect Notes' (p. 346).

The concluding portion of the list of useful Dominica timber trees, commenced in the last issue of the *Agricultural News*, is given on pp. 350-1.

### Mule Breeding in Barbados.

The Barbados Agricultural Society are applying to the Legislature of the colony to make a grant for the purchase of a stallion donkey for mule-breeding purposes in the island. It is stated that a suitable animal cannot be imported from the United States, where it is proposed to obtain it, for less than £300. Kentucky mules at present cost about £36 to £38 in Barbados, and some plantation owners find a difficulty in affording to purchase a sufficient number of animals. The services of such an animal should certainly be in considerable demand in the island, and the returns obtained would probably pay for his up-keep, and leave an annual balance towards his initial cost. In a country where mules are in such general use, it is somewhat difficult to understand why a step such as this now proposed should not have been taken long ago.

### Salt for Dairy Cows.

The beneficial effects of salt as an item in the diet of dairy cows is fairly well known among those who have had much to do with these animals, but experiments lately carried out at the Wisconsin Agricultural Experiment Station emphasize the fact that a supply of salt is absolutely necessary if the health and milk supply of the animals are to be kept up. In the observations in question, cows that had been deprived of salt soon began to exhibit an abnormal appetite for any small quantities placed before them. After the lapse of a few weeks their health showed signs of failing, with loss of appetite, a generally haggard appearance, and a rapid decline both in live weight and yield of milk. It is satisfactory to state, however, that the animals rapidly recovered from this condition when their normal allowance of salt was again supplied them. About 1 oz. of salt per cow per day is a suitable quantity to give.

### Limes and Cacao in Dominica.

In a late number of the *Dominica Guardian* reference is made to the satisfactory prices obtainable by shippers for lime juice and cacao, and it is urged that in the best interests of the industries, as well as from the point of view of justice to peasant cultivators, somewhat better prices should be paid to these small growers for their produce.

Until a short while ago, it is stated, no more than 2s. 6d. per barrel was offered for limes, but one firm, by putting up the price to 4s. per barrel, somewhat improved the outlook of the small lime grower, and gave an impetus to lime planting on the part of every one owning a small plot of land.

Dominica cacao is at present commanding 112s. to 120s. on the London market, and it is stated in the *Guardian* that the price paid to the peasantry for their produce is 12c. to 13c. per lb. It would be well if some firm would adopt the same line in connexion with cacao as the above firm did with limes, as, under present conditions, little encouragement is offered to small growers to take up the cultivation of cacao with any degree of energy.



### West Indian Agricultural Conference.

As announced in the *Agricultural News* of August 10 last, (Vol. VI, p. 241), proposals have been in hand for some time for holding another Agricultural Conference at Jamaica, in the hope of restoring the confidence of tourists and others, and of carrying out the details of the interesting programme so tragically interrupted in January last.

The Imperial Commissioner of Agriculture regrets to announce that, owing to unexpected difficulties which have arisen in regard to steamer arrangements, and in agreement with the wishes expressed by the Government of Jamaica, the arrangements for holding a Conference in Jamaica early in 1908 have now been abandoned.

The indications at present are that the next West Indian Agricultural Conference will be held at Barbados from January 14 to January 21 next.

### Agricultural Prosperity of Denmark.

The remarkable development in the production and export of dairy produce in Denmark is worthy of comment, even in countries such as the West Indies, where there exists such different natural conditions. In a recently published British *Consular Report* on the trade of Denmark, it is shown that the value of the agricultural exports during 1906 reached a value of £19,196,900, or nearly four times the total revenue of the country. The butter sent abroad represented £8,988,000, or nearly half the total value of the exports. Bacon was shipped to the value of £4,560,000, eggs £1,416,000, cattle £1,366,600, and milk and cream to the extent of £261,000, all these figures, with the exception of those representing the cattle shipments showing a substantial increase, as compared with those for the previous year. Co-operation on the part of small land-holders, both for production and for wholesale export, chiefly accounts for this agricultural prosperity.

### Trinidad's Fruit Trade.

The fruit trade of Trinidad is in a decidedly progressive condition, and it is stated that 10,000 bunches of bananas are shipped to England every fortnight. A considerable trade is also being done in oranges and limes. The *Port-of-Spain Gazette* reports that a growing demand still exists in the island for banana suckers, which are being planted in considerable quantity on cacao and sugar estates.

Although, on the estates of one proprietor in Naparima, bananas have begun to displace sugar cultivation, yet it is not thought at all likely that such a change will become general. It is not, indeed, to be wished that sugar should be so displaced, for the new crop would not require anything like the same amount of labour as the present standard crop of the island, nor would it be the means of putting so much money into circulation. With the sugar industry of Trinidad still prosperous, however, there is at the same time abundant room for a subsidiary, but also prosperous, banana industry, and one, moreover, especially adapted for small cultivators.

### Medicinal Plants in the Tropics.

An article dealing with the cultivation, in the tropics, of plants that yield useful medicinal extracts appeared in the September number of the *Mexican Investor*. The fact that several plants, now cultivated on a commercial scale on account of their medicinal value, formerly occurred naturally over large areas, but through careless destruction have become almost extinct in their original homes, is referred to—cinchona being the chief example of this. In 1861 cinchona plantations were started in Ceylon, and seven years later 3,000,000 young trees were planted in India. Twenty-five years ago India imported quinine and cinchona bark to the value of \$320,000. To-day it sends its own surplus product of the drug to the London market.

The commercial cultivation of ipecacuanha has arisen in the same way, as the result of destruction of the natural supply in the Brazilian province of Matto Grosso. The plant did not do well in India, but has given very satisfactory results in the Straits Settlements.

Coca too has been cultivated in several British colonies since the discovery, thirty years ago, of the action of cocaine as a local anaesthetic. The great demand for the alkaloid caused an immense inquiry for the leaves, the result being increased prices, and consequent cultivation of the plant as a crop.

### Agriculture in British Guiana.

Some interesting items of information are given in that part of the British Guiana Blue-book which relates to Agriculture.

The area under sugar-cane cultivation in the colony is 78,370 acres. The total area under crops other than sugar is 58,433, so that the whole of the cultivated land in British Guiana reaches only 136,803 acres. There are forty-three estates on which sugar is manufactured, and the area devoted to farmer-grown cane is increasing. The cacao, coffee, cocoa-nut and plantain estates number seventy-one, the area devoted to the first three-named crops being 6,703, 1,750 and 1,460 acres respectively.

There are about eighty-five cattle farms. Rice is cultivated over 24,568 acres, the districts having the largest areas of this crop being West Coast, Berbice, West Coast, Demerara, and banks of the rivers Canje, Corentyne, Essequibo, Demerara, and Berbice. Maize, bananas, plantains and ground provisions cover 16,460 acres.

Particulars are given as to rates of wages for labour, from which it appears that cane-cutters earn from 1s. 6d. to 3s. 6d. per day, the work being always done by task. Shovelmen earn 1s. to 2s. a day, weeders 10d. to 1s. 6d., and suppliers 1s. to 2s. The work connected with the manufacture is also chiefly done as task-work, principally by East Indians. Cane-throwers earn 1s. 2d. to 1s. 8d., firemen 1s. 4d. to 1s. 6d., sugar curers 1s. 6d. to 2s. 6d. and head clarifiers 2s. to 2s. 6d. per day.





## INSECT NOTES.

### Cockroaches and Ants as House Pests.

In an article on 'Cockroaches,' which appeared in a recent number of the *Agricultural News* (Vol. VI, p. 298), the mischief done by these pests in attacking articles of food, starched clothing, and books was referred to. As was then pointed out, boracic acid is a poison to cockroaches, and if this is mixed with any attractive food, may be used as a means of their destruction. A good method is to mix the boracic acid with equal parts of molasses or sweet chocolate, and spread the mixture on small pieces of cardboard, which are then placed in cupboards or under furniture. This mixture will not injure dogs.

For the protection of books against attack by cockroaches, the method described in Pamphlet No. 5 of the Department Series, *General Treatment of Insect Pests*, and which was given in the *Agricultural News* (Vol. II, p. 42), can be recommended. The books should be lightly painted over by means of a camel-hair brush, both outside and inside the cover (and especially along the backs where paste has been used), with the following mixture:—

- 1 oz. corrosive sublimate.
- 1 oz. carbolic acid.
- 2 pints methylated or white rum spirit.

This solution, if carefully applied, will effectually preserve books with either paper, cloth or leather covers from cockroaches and other insects. No harm will be done to the books, and after the mixture has dried, they may be handled with perfect safety. If treated in this way, books will keep as well in tropical as in temperate climates.

Book-binders in the tropics are recommended to use a paste poisoned by adding  $\frac{1}{2}$ -oz. of copper sulphate, or blue stone, to every pound of paste.

Ants are also very troublesome visitors in many houses. A short article dealing with methods of destruction that have been found to answer well was given in the *Agricultural News* (Vol. II, p. 104). One such method is to add 10 parts of sugar to 100 parts of water, and boil the solution. Cool, add 1 part of tartar emetic, and stir well. Set this mixture about in tins and other receptacles covered over with muslin or wire netting. The netting will keep back domestic animals, but at the same time allow ants to have access to the contents. A similar method is to use a mixture of 1 oz. of syrup or jam, and a small quantity of corrosive sublimate.

Another simple remedy, involving no poison, is to soak a piece of sponge in sweetened water. Place this where ants are likely to congregate, and after a while, when it is full of these insects, drop it into boiling water, and afterwards sweeten it afresh for a second lot of ants.

The laboratory at the office of this Department was at first infested with black ants that came in from outside. The use of the measures recommended above, however, soon taught them to keep away, and now the place is practically

free from them. A small amount of perseverance and personal attention to the matter, with the use of good poison, soon clears ants out of a building.

### The Pests of Introduced Cotton.

In an article in the *Agricultural Journal of India* for July last, Mr. H. Maxwell-Lefroy (formerly Entomologist on the staff of the Imperial Department of Agriculture for the West Indies), states that exotic varieties of cotton, when first introduced into India, are especially liable to attack by various insect pests, but when these cottons have become acclimatized, they suffer less. Below are given a few extracts from Mr. Lefroy's article describing the insects which have been found most troublesome in this way:—

The cotton leaf hopper is the worst pest. This small green insect sucks the juice of the leaves by cutting through the outer membranes. This attack on the leaf tissues probably gives entrance to diseased conditions which cause curling and withering of the leaves. There is no easy remedy against the leaf hopper. In the first stages of attack, the insect should be checked by liberal spraying with Crude Oil Emulsion; a strength of 1 to 50 in water should be used.

Weak cottons are particularly affected by the cotton aphid; as a rule, the natural enemies of this pest keep it in check, but it is often advisable to spray with Crude Oil Emulsion diluted as above described.

Boll-worms attack all cottons. In Sind and the Punjab, Egyptian and American varieties have, under ordinary seasonal conditions, suffered more than local kinds. Boll-worms often seriously attack the cotton bolls which first form. If these are removed and burnt, it will materially check the spread of the pest.

The leaf-roller is the only other pest which specially attacks exotic cottons. The attack is limited to a short season, and begins in the three weeks which follow the rolled leaves, and can be checked by hand-picking and burning if the work is thoroughly done.

Perennial tree cottons are also grown in Bengal and Madras, and Mr. Lefroy states that the worst pests of these varieties are two weevils, which bore into the stem and branches, causing withering, and loss of crop in consequence.

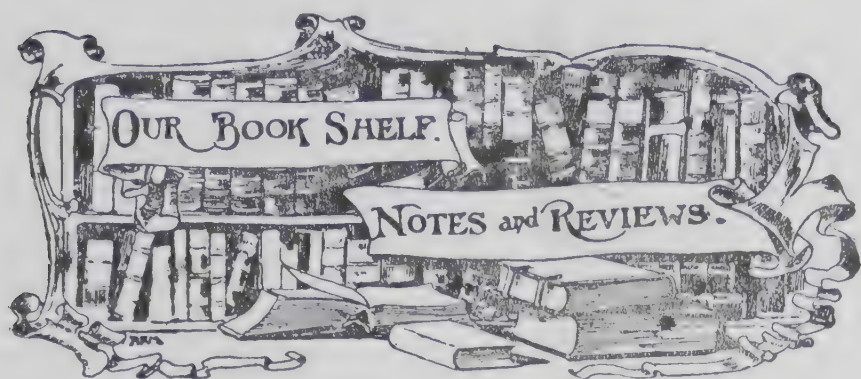
Some suggestions are made as to the best methods to be adopted in order to prevent recurring damage to the cotton plants from insect pests. It is recommended that annual cottons should be grown in rotation, not occupying the same ground oftener than every second year. At the end of the cotton season, when the crop has been gathered, all stalks and commencement of the rains. It can be easily recognized by the litter should be collected and burnt. It is stated that in the Punjab, good results have followed the introduction of parasites which preyed upon the cotton pests and kept them in check.

The importance of disinfecting imported cotton seed is also referred to in this connexion.

### DEPARTMENT NEWS.

The Imperial Commissioner of Agriculture arrived at St. Kitt's by the S.S. 'Guiana' from New York on October 20. He will make an official tour of the Northern Islands, visiting in succession St. Kitt's, Nevis, Antigua, Montserrat, Dominica, and St. Lucia, and will probably reach Barbados about the second week in November.





*JOURNAL OF THE BOARD OF AGRICULTURE : BRITISH GUIANA.* Vol. I, Nos. 1 and 2. Price 6d. Edited by A. W. Bartlett, B.A., B.Sc.

The first two numbers of the Journal of the British Guiana Board of Agriculture have just been issued in one volume, and form an interesting and instructive little booklet. It is stated in the introduction that the Journal is to be issued quarterly, with the object of supplying in a popular form information of an agricultural character suited to the requirements of the colony. While recognizing that a good deal of agricultural information is contained in the publications of the Imperial Department of Agriculture for the West Indies, and those issued by the Botanic Departments of Jamaica and Trinidad, the editor, who is the Government Botanist of British Guiana, is of opinion that the conditions and circumstances which obtain in the South American colony are sufficiently distinct to need separate attention, and it is this attention which the new Journal will endeavour to give.

Mr. Bartlett himself is responsible for the greater number of the articles in the first issue, but they are all readable and useful. The native rubber trees of British Guiana receive extended notice, in an article running into both numbers, and there are also short articles on the Management of Sheep, the Cultivation of Broom Corn, the use of Lime in Agriculture, the Ground Nut, Rules for Pruning Cacao, etc. This new publication should prove decidedly useful to the agriculturists of British Guiana.

## TILLAGE IMPLEMENTS IN ANTIGUA.

In connexion with the experiments in mechanical tillage that are described in the editorial as being carried on in Antigua, it may be interesting to note that five kinds of ploughs, two forms of cultivators and three forms of harrows, are being used. In addition to this, several other useful, labour-saving implements are also in employment, and amongst these the following may be mentioned:—

*Manure spreader*: this consists of a light wagon, the bottom of which may be made to travel towards the rear end of the wagon, by gear connected with the wheels; by this means the manure is gradually emptied out at the end of the wagon, and, while being delivered, spread by the action of a rapidly revolving drum is armed with spikes. This machine rapidly and evenly spreads manure over the fields.

*Fertilizer distributor*: this machine is used for distributing fine manures, such as chemical manures and cotton seed meal. The quantity to be applied can

be regulated, and the machine ensures regular and even distribution.

*Corn or cotton planter*: this machine, which is drawn by one mule, is used for sowing seeds such as corn, cotton, woolly pyrol, beans, etc., etc. It can be adjusted to drop two or more seeds accurately at distance, which may be regulated from 8 to 24 inches; small seeds may be dropped in a continuous row. This machine effects a great saving in time, labour and seed when planting cotton and corn, and is likely to come into general use.

It must be observed that the use of these implements necessitates a fair amount of skill and judgement; their successful introduction has depended largely on the presence of an expert planter familiar with the uses of each machine, capable of using the implements himself, and of instructing the work-people in their manipulation. But for this a common experience would have been repeated; the implements would have been worked by unskilful hands, and would have been set aside as unsuited for local conditions.

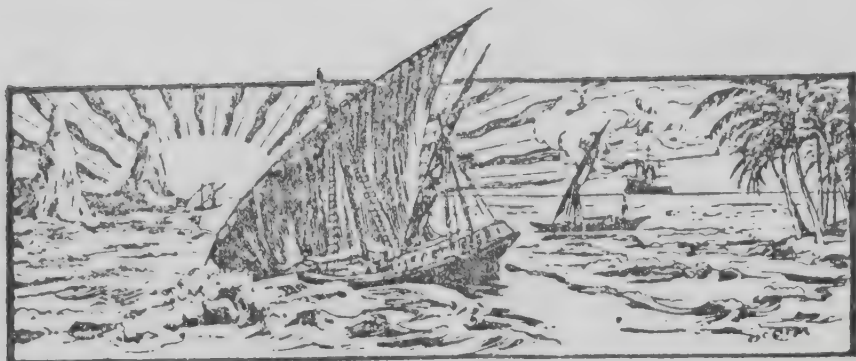
The introduction of these implements is exercising a stimulating effect, thus leading planters to study closely the details of their work with a view to improving their methods: this being so, it is probable that this step marks only the beginning, and not the end, of a series of agricultural improvements.

## COFFEE IN CUBA.

In the *Cuba Review* for August the following short account of the coffee industry of the island is given:—

Coffee was introduced into Cuba as early as 1720, and the first coffee plantation was established near Havana in 1748. French immigrants from Hayti extended the cultivation of this berry in 1780, and the industry thrived so well that in 1846 there were about 2,328 coffee plantations in Cuba. The price of coffee went down, and its cultivation began to diminish in 1850, and in 1894 there were only 191 estates. The cause of this decrease was not simply owing to the lower prices that were brought about as the result of competition with coffee imported from South America and East India, but was principally owing to the careless methods employed in the cultivation of the crop, the result of which was that the coffee produced decreased both in quantity and quality. Furthermore, it was found to be more profitable to raise sugar-cane and make sugar. Mountainous or hilly regions, and a fertile soil, loose and fresh, are the requirements for producing a good crop. The tender shoots are easily injured by dry weather and heavy winds, so it is desirable to plant them in a shady place, well sheltered from storms and rains. Therefore, the plantations are generally devoted to other products and the plants are raised between orange, banana, or other trees. The plantations begin to produce the berries within three or four years, and within seven years the crop is usually very flourishing. The little plants bloom from December to May, and the berry takes from seven to eight months to ripen and develop fully. The harvest is in October. Usually the cultivation of other products will cover the cost of cultivating the coffee plants, and after a few years the harvest will bring in good profit.





## GLEANINGS.

A new cotton ginnery is in course of erection at Blake's estate, Montserrat. (*Montserrat Herald*.)

The *Louisiana Planter* states that about 8,000 immigrants were expected to arrive at Cuba during October, chiefly from Spain.

Professor J. B. Farmer, F.R.S., has accepted the editorship of the *Gardeners' Chronicle* in succession to the late Dr. M. T. Masters, F.R.S.

The live stock exports from British Guiana during 1906-7 include 1,389 head of cattle, valued at £6,652 11s. Pigs were also exported to the number of 443, having a value of £346 18s.

The Jamaica Board of Agriculture has imported a large quantity of selected Sea Island cotton seed from St. Vincent, for sale and free issue in small quantities for experiment. (*St. Vincent Times*, Sep. 26.)

The *Southern Planter* urges a greater production of pea-nuts in America, and estimates the annual consumption of this fruit by the people of the United States as having a value of \$50,000,000.

The cotton area of St. Kitt's is reported to show a considerable extension this season, and to have nearly reached 2,000 acres, as against 1,500 acres last year.

The *Southern Planter* recommends small quantity of tobacco leaf, powdered with salt, as a cure for intestinal worms in sheep and goats. Another remedy for the same trouble, which is mentioned as having been used with good results, is a 1-per cent. solution of coal tar creosote in water. Four liquid ounces is a good dose of this.

During the past season, 6,192 tons of peasant grown sugar-cane were purchased at Bendals Sugar Factory, Antigua, at a cost of £2,696. At Gunthorpe's factory, too, the amount of peasant cane has increased considerably, as compared with last year.

The output of cacao from the Brazilian State of Bahia has nearly doubled during the last six years, the quantity exported having increased from 13,000 tons during 1900, to over 23,500 tons during 1906.

A new cotton factory is being erected by Mr. C. J. Simmons, at Kingstown, St. Vincent, and is nearing completion. It is fitted with three power gins, driven by an oil engine of 12 horse power of the latest make.

Drought has been experienced in St. Kitt's for several months past, but heavy rains fell on Saturday and Sunday, the 11th and 12th of October. As much as 5 inches were recorded at some places.

St. Croix has suffered very much from drought during the past season, and the prospects for the next sugar crop are stated to be discouraging. Cotton, however, has not suffered to the same extent as the sugar-cane, and looks more promising.

Sugar cultivation is extending in Natal. While in 1905-6, the area under sugar-cane was 10,879 acres, in the present year it has increased to 40,904 acres. The average yield of sugar per acre last year was 1.7 tons. (*Natal Agricultural Journal*, July.)

Blue Mountain (Jamaica) coffee fetched the record price of 149s. per cwt. in Liverpool towards the end of September. The highest figure that had before been reached was 140s. per cwt., this price having been obtained some thirty years ago. (*Jamaica Daily Telegraph*, October 10.)

The *West Indian Committee Circular* mentions that of a consignment of avocado pears sent from Trinidad, no less than 70 per cent. arrived in London in good condition, after having been twenty-three days in transit. The pears were picked 'full,' but not ripe, and special care was taken in the packing to prevent bruising.

The Commissioner of the Cayman Islands reports that during the last eight months the husks of over two million cocoa-nuts have been thrown into the sea from those islands. The *Journal of the Jamaica Agricultural Society* wisely points out the great amount of fertilizing matter that is wasted in this way, and which might advantageously be applied to the cocoa-nut trees themselves.

A paragraph in the *Louisiana Planter* of September 28 last states that considerable efforts are being made to create a rice growing and exporting industry in Brazil, where vast areas of land suitable for the cultivation of this crop exist, more especially in the state of Rio Janeiro. It is also stated that arrangements have been made for a colony of Japanese immigrants to settle in this state, with a view to their making a speciality of rice culture.

Several districts in Jamaica are reported to have suffered very seriously from drought for several months past. A correspondent of the *Gleaner*, writing from Gayle, states that the pimento, orange, and banana crops have practically all been destroyed. Another correspondent, writing from St. Anns, reports the same state of things in his parish, and adds that the coffee crop, as well as a very promising bread-fruit crop, have come to nothing. Yams and other provision crops have also been ruined by the drought.

According to an article in the *Port-of-Spain Gazette*, the tariff for goods transport on the Trinidad railway is so high that although sweet potatoes are grown in large quantity at Savannah Grande, they cannot be brought to market in the city with any remuneration to the producer. At the same time hundreds of barrels of sweet potatoes are imported into Trinidad from the neighbouring colonies. The freight over the 40 miles of railway in question is stated to be higher than would be the charge from New York to Trinidad.



## WEST INDIAN PRODUCTS.

### Drugs and Spices in The London Market.

The following report on the London drug and spice market for the month of August 1907, has been received from Mr. J. R. Jackson, A. L. S. :—

Business in the abovenamed articles, as is usual in the month of August, has been anything but brisk. The month itself is the holiday month of the year, and the occurrence of the bank holiday practically reduces the month to three weeks only for business purposes, and during these three weeks but very few changes in the price of goods which come under our special notice have occurred. The catalogues of new and old goods have neither been numerous nor bulky, with the consequence that the new arrivals have been very few and the demand only normal. The following notes refer to West Indian products :—

#### GINGER.

Very little ginger of any description was offered at any of the sales during the month. Indeed, the fruit offerings were made at the spice auction on the 21st, and neither at this nor at the remaining sale on the 28th, was there any in Jamaica. There has been, in fact no demand for ginger; the 195 bags of washed rough Cochin, slightly wormy, and 16 bags of Bengal, which was all that was put up on the 21st., were all bought in, the former at 31s. 6d. and the latter at 30s. per cwt. It would seem that the demand for ginger has, for the time, passed to America, where considerable sales in Jamaica at firm prices are reported.

#### NUTMEGS, MACE, AND PIMENTO.

In the early part of the month nothing much was done in these spices, but on the 21st, there was a large supply of West Indian nutmegs, amounting to 763 packages, which were said to be a record quantity, the whole of which were sold at full prices. At the last sale, however, on the 28th, a slight drop had occurred. With regard to mace there was also a large consignment offered on the 21st, consisting of 190 packages of West Indian, which sold at from 1s. 4d. to 1s. 5d. for fair to good palish, 1s. 3d. for mixed, 1s. 2d. for ordinary and red, and 1s. to 1s. 1d. for low red. A week later the prices for West Indian remained practically the same, but Penang and Java fetched, the former 1s 7d. for dull partly wormy, and for bright red Java, 1s. 3d., and dull 1s. 2d.

No pimento has been offered at auction, but practically 3d. per lb. has been the price paid.

### ONION CULTIVATION.

The *Bulletin* of the Agricultural Department of the Bahamas for July last, has a short article, but one full of practical detail, on the cultivation of the onion crop. The red and white Bermuda onions are stated to give best results in the Bahamas, the white being usually preferred. Seed is obtained from Teneriffe, but a quantity was lately imported from England, for free distribution by the Board of Agriculture.

The seed is sown in well-prepared nursery beds, the soil of which is well pulverized. It is advisable that these beds should be raised about 1 foot; drills are made across the bed about 4 to 6 inches apart, and in these the seed is sown. Sowing begins in August, and is continued till about the middle of September. Advantage is found in sowing a large crop at intervals, as there is risk of the young seedlings suffering in the nursery beds before they can be planted out, if the whole of the crop is sown at one time.

The heavy rains tend to wash the small seed out of the ground, unless some protection is afforded. This is well supplied in the form of bushes laid on sticks which are supported by posts on either side of the bed.

The onions are transplanted to the permanent bed when they are about 4 or 5 inches high; this will generally be about six or eight weeks after sowing. It is well to water the nursery bed before removing the young plant, as this will facilitate operations. It is important that onions should not be planted too deeply, as this will interfere with their growth; about 1 inch is the proper depth. Onions will be ready for gathering when the leaves ripen and dry up. This will take place about February or March. After pulling, they must be dried, and this is best done by spreading them on the floor of a well-ventilated shed. When dried, they are cleaned, the leaves and tops being pulled off. The drying process takes about two or three weeks, and during this time the onions shrink considerably.

The extent of the crop obtained will depend considerably upon the soil, the manure applied, and the attention that has been given to the crop, in the way of weeding etc. In England and America, a yield of 800 bushels, or 44,800 lb. per acre is frequently obtained. At 1d. a pound, a crop like this would give a gross return of £180 per acre. If, however, no more than a quarter of this yield is anticipated, a gross return of £45 per acre, gained in four months, is surely worth striving for.

Reference is made in the article in question to the export trade in onions, but small growers in the West Indies would undoubtedly find a ready market at home for their produce.

### CACAO IN ECUADOR.

The September number of the *Mexican Investor* contains the following particulars with regard to the production of cacao in Ecuador :—

The principal product of Ecuador is cacao, of which it furnishes nearly one-fifth of the world's production, which is now estimated at 300,000,000 lb.

The cacao tree grows on the warm lowlands and in the valleys tributary to the coast. The valleys adjacent to Guayaquil produce the greatest quantity of any district in the world. In 1900 there were 4,827 cacao plantations or farms in Ecuador, with a total of 58,551,142 trees. The yearly production in pounds was: In 1900, 41,134,000; in 1901, 51,311,000; in 1902, 53,621,300; in 1903, 49,921,300; in 1904, 61,339,000; in 1905, 47,225,400; and in 1906, 51,690,500.

Guayaquil cacao has special characteristics of its own, both in shape and in aroma, and is easily distinguished from the cacao of other districts. The lower grades are very strong and coarse in flavour, while the better grades contain a large percentage of theobroma, making them more valuable. Here the cacao is divided into two classes, viz., up river (arriba) and down river (abajo); to the latter class belong the grades known as Machala, Balao, Naranjal, and Tenguel.

The cacao coming from the plantations situated in the up-river district is far superior and always sells at higher prices.

The value of the annual exports of Ecuador, in round numbers, amount to \$8,000,000, two-thirds of which is cacao. The planting and cultivation of the cacao tree is being carried on more extensively every year, as it is the general opinion that the article has a splendid future and that the present production is not sufficient to meet the growing demand or consumption.



## USEFUL TIMBER TREES OF DOMINICA.

Below is given the concluding portion of Dr. Imray's list of the useful timber trees of Dominica, the first part of which appeared in the last number of the *Agricultural News* (Vol. VI, pp. 334-5).:—

**Mille branches.** Large hard-wood tree, employed for mill rollers and other mill work.

**Bois affle** (*Freziera undulata*). Large tree, sawn into planks and boards for general use; gun stocks are made of this wood.

**Bois violin** (*Guatteria* sp.). Tree about 2 feet in diameter; the boards and planks are available for inside house work; wood does not last in the ground; used for spars, oars, staves; wood light.

**Bois Bambarra** (*Diospyros* sp.). Large tree, 4 to 5 feet in diameter; wood tough and strong, employed for oars, mortar pestles, etc.; the seeds are sometimes used in killing fish in the rivers: timber available for inside house work.

**Bois decree** (*Morisonia Imrayi*). Large tree; timber used for ordinary purposes and cabinet work.

**Bois diable** (*Licania hypoleuca*). Very hard, tough wood, useful in house building, makes the best charcoal, used for making flambeaux; does not stand moisture.

**Bois cote.** Large tree, very good timber; employed for all kinds of house work, posts, etc.

**Figuier petite feuille** (*Ficus lentiginosa*). Timber used in house-building; the wood is soft and not durable.

**Bois sophie** (*Acacia* sp.). Small tree, durable for posts, fancy cabinet wood.

**Tamarind** (*Tamarindus indica*). The wood of the tamarind tree is tough and elastic, and is applicable for handles of axes, hoes, and other tools; the preserved fruit is an article of commerce.

**Guava** (*Psidium Guajava*). The wood of the guava is very tough, and is employed as handles for hoes, axes, etc., like the tamarind wood, and the fruit makes excellent jelly.

**Sweet Orange, and Sour Orange** (*Citrus Aurantium*). The wood of the orange tribe is very tough, and is employed as handles for axes, hatchets, and other tools.

**Bois perdrix.** Small tree, wood tough, and used as handles for hoes, axes, and other tools, also very pretty cabinet wood.

**Petit baume.** Small tree, used for posts, wattles, etc. and for making flambeaux, etc.

**Bois vinett.** Small tree, used for posts, and making flambeaux.

**Bois Candelle** (*Amyris* sp.). Small tree, used for posts and making flambeaux.

**Bois cariabe** (*Sabinea carinalis*). Small tree, used for posts, and fancy cabinet wood.

**Poirier montagne** (*Erostemma caribaeum*). Small tree, used for posts and making flambeaux; pretty cabinet wood; durable.

**Bois carre.** Small tree adapted for fancy cabinet wood.

**Quina** (*Erostemma floribundum*). Small tree, used for posts and rafters; the bark of this tree is possessed of tonic and emetic properties, and is used in the country medicinally.

**Bois masse.** Tree 12 to 18 inches in diameter; timber used for house work and cabinet making; also for mallets; wood tough.

**Sicah or Abricot marron.** Tree about 2 feet in diameter, and employed for inside and outside work, posts, sills, plates, beams, etc.

**Bois hypolite.** Tree from 2 to 3 feet in diameter, made into posts, shingles, rafters, etc.

**Bois marbre** (*Ardisia* sp.). Small tree, pretty cabinet-making wood.

**Ragigond.** Large tree, timber used for inside house work.

**Acouquoi jaune.** Tree from 2 to 2½ feet in diameter; valuable wood, used for all purposes, inside and outside work; furniture wood.

**Bois contrevent.** Valuable hardwood tree, fully 4 feet in diameter; employed for mill rollers, frames, etc., furniture wood, sideboards, beds, etc.; house-building and generally.

**Balate.** Large hard-wood tree, 3 to 5 feet in diameter; the wood is dense and tough, and is valuable for mill rollers and frames, plates, beams, etc.; inside house work; does not stand water well.

**Pomme Rose** (*Eugenia Jambos*). Tree about 18 inches in diameter; the young branches are employed for making hoops for sugar hogsheads; fruit tree.

**Simarouba** (*Simaruba amara*). Tree 3 or 4 feet in diameter; timber used for inside house work, heading for casks; used medicinally.

**Bois Debasse** (*Myrcia ferruginea*). Tree about 18 inches in diameter, employed for house posts and rafters.

**Bois blanc or Montagne.** Tree, 3 feet in diameter, used for inside and outside house work.

**Bois Rassade rouge.** Tree 2½ feet in diameter, used for posts and rafters; may be sawn into boards and planks.

**Bois Rassade blanc.** Used same as Bois Rassade rouge.

**Gombo Montagne.** Tree 3 feet in diameter, sawn into boards and used for house building.

**Bois sang rouge, Bois sang blanc.** Tree 2 to 3 feet in diameter, sawn into boards for inside and outside house work; shingles.

**Arali** (*Clusia* sp.). Tree makes excellent posts, lasts long in the ground.

**Bois long** (*Freziera* sp.). Large tree, 3 or 4 feet in diameter, employed for shingles and posts.

**Bois petite feuille rouge, Bois petite feuille blanche.** Large tree, 3 or 4 feet in diameter, used for boards, posts and shingles; durable wood, lasting in water.

**Bois Canon** (*Cecropia peltata*). Tree, 3 feet in diameter, sawn into boards, used in house building, palings.

**Groseitter.** Large tree, 3 feet in diameter, used for making into posts, beams, rafters, etc.; may be sawn into planks and scantling.

**Bois Mammie.** Tree 2 to 3 feet in diameter, used for boards and fences, also in house building, inside and out, and lasts well in water.

**Tamarin Montagne.** Small tree, used for posts and palings, also sawn into boards, and lasts well in water.

**Laurier jaune.** Small tree, employed for boards, shingles and ordinary purposes.

**Laurier Isabelle** (*Ocotea* sp.). Small tree, wood hard; used for posts and shingles, and sawn into boards; cabinet wood.

**Laurier-avocat** (*Aydenndron* sp.). Small tree, light wood, and employed for shingles, posts, rafters, etc.

**Laurier noir.** Small tree; makes good shingles planks, and boards.

**Laurier Marbre.** Tree 2 to 3 feet in diameter, sawn into boards and planks; furniture wood; shingles.



**Laurier Copre** (*Ocotea* sp.). Tree 2 to 4 feet in diameter; the timber is used for all kinds of work, inside and out.

**Laurier blanc.** Useful wood, made into boards, planks, rafters, etc.

**Laurier cannelle.** Tree 2 to 3 feet in diameter, excellent timber; made into boards, planks, rafters, etc., and may be used for any purpose.

**Laurier fetide.** Tree 2 to 4 feet in diameter, used for the same purposes, and of equal good quality as the Laurier cannelle.

**Laurier calibre.** Tree 2 feet in diameter, made into shingles, planks, etc.

**Laurier pin.** Tree 2 to 3 feet in diameter; good timber, used for shingles, planks, and all kinds of house work.

**Laurier Madame** (*Nectandra Willdenoviana*). Large tree, good timber; used for planks, beams, posts, rafters, cabinet work.

**Laurier reglisse.** Tree about 18 inches in diameter, used for posts, rafters, plates, etc.

**Laurier falaise.** Tree 18 inches in diameter; timber used for inside work.

**Laurier muscat.** Tree about 3 feet in diameter, made into boards, shingles, and rafters; used for inside and outside house work, furniture wood.

**Laurier riviere.** Tree about 4 feet in diameter, grows large in water; timber used for all kinds of inside and outside house work, also for shingles.

**Laurier Mangle.** Tree 3 feet in diameter, used for inside and outside house work.

**Mangle blanc** (*Moronobea coccinea*). Large and lofty tree, valuable timber; may be sawn into planks and boards for ordinary use, and makes excellent staves.

**Mangle rouge** (*Guttiferrae*). Tree about 12 to 18 inches in diameter; the best wood of the country for staves for sugar hogsheads, almost equal to the red oak staves.

**Olivier** (*Terminalia Buceras*). Very large tree, timber valuable; made into boards and planks, used for all work, (inside and out); very durable in water; the wood is difficult to ignite and does not flame; one of the best woods for shingles.

**Seaside grape** (*Coccoloba uvifera*). Tree about 2 feet in diameter; timber used chiefly for boat building.

**Kreke petit Kreke** (*Melastoma* sp.) Small tree, wood soft and of little value, used for posts in house building.

**Orange montagne.** Timber used in mill work, house posts, beams, and rafters.

**Bois graine rouge.** Large tree, boards used for inside and outside work, heading for sugar hogsheads.

**Acacia** (*Acacia Farnesiana*). Wood employed for posts, being very durable in the ground; cabinet wood; the husks of the pods are pounded and boiled in water, and this decoction is rubbed on leather to colour it black.

**Gueppois.** Small tree, used for making walking sticks and posts in the ground, being very durable.

**Café Marron rouge.** Employed for same purpose as Café Marron; good for posts and in house building.

**Bois Ledat.** Timber may be used for ordinary purposes.

**Acouquoi gris.** Large tree, timber durable, employed for house and garden posts, and may be used for rafters, beams, etc.

**Goyavier Montagne.** Middle-sized tree, timber used for mill work.

**Goyavier Douce.** Large tree, employed for mill work, house posts, beams, etc., used only for inside work, not lasting in the ground.

**Sureau.** Small tree used for house posts, not of value.

**Greenheart** (*Nectandra Rodieri*). Valuable timber tree employed for mill work, etc.; very pretty cabinet wood.

**Acajou nouveau.** Tree nearly 3 feet in diameter, sawn into boards and planks for general use, shingles and furniture wood.

**Bois Anglais.** Large tree, timber used for ordinary purposes, shingles, posts, rafters, etc.

**Bois Manioc.** Tree 2 to 3 feet in diameter, timber used in house building, inside and out; lasts well in water.

**Cacao Marron.** Tree about 2 feet in diameter; used in house building and shingles.

**Bois l'Ail** (*Cassipourea elliptica*). Tree 2 feet in diameter; used for posts, rafters, etc., and in house building; might be used in cabinet work.

**Bois Carrierie.** Timber used for ordinary purposes.

**Bois Gomme.** Large tree, timber used in house building.

**Bois Lait.** Tree about 2 feet in diameter; used for house posts and rafters; may be sawn into boards for inside work.

**Bois Bouele.** Small tree, pretty cabinet wood; useful for house and garden posts, rafters, etc.

**Reinette.** Small tree, used for house and garden posts.

**Pin de epice.** (*Lucuma* sp.). Large tree, employed for mill work, rollers, etc., and sawn into boards for indoor work.

**Acajou.** Cabinet wood.

**Bois fleur jaune** (*Tecoma stans*). Small tree, employed for inside house work.

**Soap berry** (*Sapindus* sp.). Timber used for ordinary purposes.

**Bois Vin.** Large tree, timber employed for inside house work.

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## JALAP.

True jalap is obtained from a Mexican perennial twining plant, of the order Convolvulaceae, *Ipomoea* (*Exogonium*) *Purga*.

This plant has long twining stems, with entire leaves, minute bracts, and tubular flowers, the corolla being over 2 inches long, salver-shaped, and rose-purple in colour. The plant sends out runners in the soil, which are provided with scale leaves. New stems grow from the axils of these scales, while roots are formed below, which usually become tuberous. These tuberous roots, when dried in the sun or over fires, form the jalap root of commerce. They are a few inches long, taper below, and are marked with small transverse scars. The dried roots contain 10 or more per cent. of resin, which is extracted by alcohol and purified by washing with water. In the true jalap, which is called commercially Mexican or Vera Cruz jalap, only one-tenth of the resin present is soluble in ether. Tampico and Orizaba jalaps are produced by allied species of *Ipomoea*; but are distinguished by the entire solubility in ether of the resins they contain. Still other species of *Ipomoea* that also have tuberous roots contain small quantities of similar resins, and are used as adulterations of true jalap root. The British Pharmacopoeia requires a minimum of 10 per cent. of resin in the roots. Jalap is much employed in medicine as a laxative, or as an active purgative, according to the dose. It has been grown successfully in Jamaica, from whence exports have been made; but at present practically all the supplies of the drug on the London market are obtained from the east coast of Mexico.



## MARKET REPORTS.

London,—October 15, 1907. 'THE WEST INDIA COMMITTEE CIRCULAR,' Messrs. KEARTON, PIPER & Co.; October 4, Messrs. E. A. DE PASS & Co.; 'THE LIVERPOOL COTTON ASSOCIATION WEEKLY CIRCULAR,' October 11, 1907.

ARROWROOT—St. Vincent,  $2\frac{1}{4}d.$  to  $2\frac{3}{4}d.$  per lb.

BALATA—Sheet,  $2\frac{2}{3}$  to  $2\frac{7}{8}$ ; block,  $1\frac{1}{10}$  to  $1\frac{1}{10}\frac{1}{2}$  per lb.

BEES'-WAX—£7 5s. to £7 10s. per cwt.

CACAO—Trinidad, 114/- to 122/- per cwt.; Grenada, 114/- to 121/-; Dominica, 112/- to 120/-; Jamaica, 110/6 to 118/-; Demerara, 120/-; St. Lucia, 116/- to 121/- per cwt.

COFFEE—Jamaica, 48/6 to 57/3; Santos, 30/9 per cwt.

COPRA—West Indian, £22 5s. to £22 10s. per ton.

COTTON—St. Kitt's,  $18\frac{1}{2}d.$  to  $21d.$ ; St. Thomas,  $22d.$ ; Montserrat,  $19d.$ ; Antigua  $24d.$ ; Barbados,  $21d.$ ; Nevis,  $19d.$ ; St. Croix,  $18d.$  per lb.

FRUIT—

BANANAS—Jamaica, 4/6 to 5/- per bunch.

PINE-APPLES—St. Michael, 2/3 to 4/6 each.

GRAPE FRUIT—13/- to 17/- per box.

ORANGES—Jamaica, 7/- to 9/6 per box.

FUSTIC—£4 5s. to £4 15s. per ton.

HONEY—22s. 6d. to 23s. 6d. per cwt. for dark liquid to yellowish.

ISINGLASS—West India lump,  $1\frac{1}{10}$  to 2/- per lb.; cake,  $1\frac{1}{3}$ .

LIME JUICE—Raw,  $1\frac{1}{2}$  to  $1\frac{1}{5}$  per gallon; concentrated, £22 5s. to £22 10s. per cask of 108 gallons; Distilled Oil, 2s. 5d. to 2s. 7d. per gallon; hand-pressed, 4/- to  $4\frac{1}{3}$  per gallon.

LOGWOOD—£4 4s. to £4 15s. per ton; Roots, £3 5s. to £4 5s. per ton.

MACE—Fair, 1/- to  $1\frac{1}{3}$ ; pale,  $1\frac{1}{4}$ ; broken, 10d. to 1s.; ordinary 1s. to 1s. 1d. per lb.

NUTMEGS—63's to 64's,  $1\frac{1}{2}$  to  $1\frac{1}{4}$ ; 67's to 70's, 9d. to  $9\frac{1}{2}d.$ ; 73's to 74's,  $7\frac{1}{2}d.$  to 9d.; 78's to 86's, 7d. to 8d.; 87's to 91's,  $5\frac{1}{4}d.$  to  $6\frac{1}{2}d.$ ; 92's to 98's, 5d. to 6d.; 100's to 111's,  $4\frac{1}{2}d.$  to  $5\frac{1}{2}d.$ ; 112's to 117's,  $4\frac{1}{4}d.$  to  $4\frac{3}{4}d.$ ; 118's to 124's, 4d. to  $4\frac{1}{2}d.$ ; 125's to 142's,  $3\frac{1}{2}d.$  to  $4\frac{1}{2}d.$ ; 146's to 157's,  $3\frac{1}{4}d.$  to  $3\frac{3}{4}d.$

PIMENTO—Fair,  $3\frac{1}{2}d.$  per lb.

RUBBER—Fine hard Para,  $4\frac{3}{4}d.$  to 4s  $4\frac{1}{2}d.$ ; fine soft,  $4\frac{3}{4}d.$  to 4s.  $3\frac{1}{2}d.$  per lb.

RUM—Jamaica, common,  $2\frac{7}{8}$ ; good, 2s. 10d.; fine, 3s. to 8s.; Demerara, 1/1 to  $1\frac{1}{2}$  per proof gallon.

SUGAR—Crystals, 18/-; Muscovado, 14s. 6d.; Molasses, 13s. 9d. to 14s.

Montreal,—August 9, 1907.—Mr. J. RUSSELL MURRAY.  
(In bond quotations, c. & f.)

COCOA-NUTS—Jamaica, \$32.00; Trinidad, \$29.00 per M.

COFFEE—Jamaica, medium, 10c. to 12c. per lb.

GINGER—Jamaica, unbleached, 15c. to 16c. per lb.

MOLASSES—Antigua, 19c.; Barbados, 22c. to 23c. per Imperial gallon.

NUTMEGS—Grenada, 16c. to 17c. per lb.

PIMENTO—Jamaica, 6c. to  $6\frac{1}{2}c.$  per lb.

SUGAR—Grey crystals, 96°, \$2.50 per 100 lb.

—Muscovados, 89°, \$2.06 per 100 lb.

—Molasses, 89°, \$1.80 per 100 lb.

New York,—October 4, 1907.—Messrs. GILLESPIE BROS. & Co.

CACAO—Caracas, 26c. to 27c.; Grenada,  $25\frac{1}{2}c.$  to  $26\frac{1}{2}c.$ ; Trinidad,  $25\frac{1}{4}c.$  to  $26\frac{1}{2}c.$ ; Jamaica, 24c. to 25c. per lb.

COCOA-NUTS—Jamaica, select, \$30.00 to \$32.00; culls, \$18.00 to \$20.00; Trinidad, \$28.00 to \$31.00; culls, \$17.00 to \$19.00 per M.

COFFEE—Jamaica ordinary,  $7\frac{1}{4}c.$  to  $7\frac{7}{8}c.$ ; good ordinary,  $7\frac{1}{4}c.$  to  $7\frac{7}{8}c.$ ; good washed, 11c. to  $11\frac{1}{2}c.$  per lb.

GINGER—Small to bold scraggy root,  $14\frac{1}{4}c.$  to  $15\frac{1}{2}c.$ ; small to bright bold,  $15\frac{3}{4}c.$  to  $16\frac{1}{2}c.$  per lb.

GOAT SKINS—Jamaica, 50c.; St. Kitt's, Antigua, and St. Thomas, 43c. to 48c.

GRAPE FRUIT—Jamaicas, \$4.00 to \$9.00 per barrel; \$3.00 to \$5.00 per box.

LIMES—\$3.50 to \$5.25 per barrel.

MACE—30c. to 35c. per lb.

NUTMEGS—110's,  $11\frac{1}{4}c.$  to  $12\frac{1}{4}c.$  per lb.

ORANGES—Jamaica, \$2.25 to \$2.75 per box; \$5.00 to \$6.00 per barrel.

PIMENTO— $6\frac{1}{2}c.$  per lb.

SUGAR—Centrifugals, 96°, 3.95c.; Muscovados, 89°, 3.45c.; Molasses, 89°, 3.09c. per lb., duty paid.

## INTER-COLONIAL MARKETS.

Barbados,—Messrs. JAMES A. LYNCH & Co., October 29, 1907; Messrs. T. S. GARRAWAY & Co., October 12, 1907.

ARROWROOT—St. Vincent, \$4.50 per 100 lb.

CACAO—Dominica, \$24.00 per 100 lb.

COCOA-NUTS—\$22.80 per M. for husked nuts.

COFFEE—Jamaica, \$9.50 to \$10.50 per 100 lb.

HAY—\$1.60 to \$1.80 per 100 lb.

MANURES—Nitrate of soda, \$62.00 to \$65.00; Ohlendorff's dissolved guano, \$55.00; Cotton manure, \$42.00; Cacao manure, \$42.00 to \$48.00; Sulphate of ammonia, \$72.00 to \$75.00; Sulphate of potash, \$67.00 per ton.

ONIONS—Madeira, \$2.00 to \$2.50 per 100 lb.

POTATOS, ENGLISH—\$3.00 per 160 lb.

PEAS—Split, \$6.00; Canada, \$3.60 per bag.

RICE—Demerara, \$5.50 to \$5.75 (177 to 180 lb.); Patna, \$3.65 to \$4.00; Rangoon, \$3.00 to \$3.10 per 100 lb.

SUGAR—Yellow crystals, \$3.75 per 100 lb.

British Guiana,—October 19, 1907.—Messrs. WIETING & RICHTER.

ARROWROOT—St. Vincent, \$10.00 to \$10.50 per barrel.

BALATA—Venezuela block, 32c.; Demerara sheet, 48c. per lb.

CACAO—Native, 16c. to 17c. per lb.

CASSAVA—No stock.

CASSAVA STARCH—\$9.00 per barrel.

COCOA-NUTS—\$12.00 to \$16.00 per M.

COFFEE—Creole, 13c. to 14c.; Jamaica, 12c. per lb.

DHAL—\$4.60 to \$4.90 per bag of 168 lb.

EDDOS—\$1.20 to \$1.68 per barrel.

MOLASSES—18c. to 19c. per gallon.

ONIONS—Madeira,  $1\frac{1}{4}c.$  to  $2\frac{1}{2}c.$  per lb.; Lisbon 2c.

PLANTAINS—20c. to 48c. per bunch.

POTATOS—Madeira,  $\frac{3}{4}c.$  to 1c. per lb.

POTATOS, SWEET—Barbados, \$1.56 per bag.

RICE—Creole, \$4.75 to \$5.00 per bag; Seeta, \$6.00 per bag.

SPLIT PEAS—\$6.50 to \$6.75 per bag (210 lb.).

TANNIAS—\$2.52 per bag.

YAMS—White, \$3.00; Buck, \$3.00 per bag.

SUGAR—Dark crystals, \$2.17 $\frac{1}{2}$  to \$2.55; Yellow, \$2.90 to \$3.10; White, \$3.60 to \$4.00; Molasses, \$1.80 to \$1.90 per 100 lb. (retail).

TIMBER—Greenheart, 32c. to 55c. per cubic foot.

WALLABA SHINGLES—\$3.50 to \$5.50 per M.

Trinidad,—October 19, 1907.—Messrs. GORDON, GRANT & Co.

CACAO—\$24.75 to \$26.25 per fanega; Venezuelan, \$26.00 per fanega.

COCOA-NUTS—\$22.00 per M., f.o.b.

COCOA-NUT OIL—\$0.90 per Imperial gallon (cask included).

COFFEE—Venezuelan, 7c. to  $7\frac{1}{2}c.$  per lb.

COPRA—\$3.75 per 100 lb.

DHAL—\$4.40 to \$4.50 per 2-bushel bag.

ONIONS—\$2.00 to \$2.25 per 100 lb. (retail).

POTATOS, ENGLISH—\$1.25 to \$1.50 per 100 lb.

RICE—Yellow, \$5.60 to \$5.65; White, \$5.50 to \$6.55 per bag.

SPLIT PEAS—\$5.50 to \$5.75 per bag.

SUGAR—Grocery grades, \$1.60 to \$3.25 per 100 lb. according to quality.





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20·4d. per lb. This, however, does not give the entire value of the industry, as 912 tons of seed of the value of £4 560 has to be added to that of the lint, which brings up the total value of the cotton industry for the season 1906-7 to £76,876.

ESTIMATED AREA AND VALUE OF THE COTTON EXPORTED FROM BARBADOS DURING THE YEARS 1902-7.

Year.	Area planted.	Lint. lb.	Seed. lb.	Value of lint.	Value of seed at £5 per ton.	Total value.
1902-3	16	5,550	13,450	£12,388	£1,055	£318
1903-4	800	192,061	472,510	£20,869	£1,890	£13,443
1904-5	1,647	314,232	846,882	£30,363	£2,633	£22,759
1905-6	2,000	479,418	1,179,468	£72,326	£4,560	£32,996
1906-7	5,000	852,408	2,042,840			£76,876

The Cotton Industry at Barbados.

FROM October 1, 1906, to September 31 last, the year during which the cotton grown in 1906 was reaped, the total quantity of cotton shipped from Barbados (the produce of the 5,000 acres estimated to be under this crop,) was 1,796 bales, containing 852,408 lb. of lint, and 11 bags containing 1,120 lb. of seed-cotton, of the estimated value of £72,326 10s. 4d., being an average price of

As will be seen by the above table, the Barbados cotton industry was started in 1902, in which year 16 acres were planted, and since then the area has been continuously increased, until in 1906 something like 5,000 acres were under this crop.



Although these results are highly satisfactory, and redound greatly to the credit of the planters, and to the Department of Agriculture, which has assisted in every way possible in bringing the industry to its present condition, there are still a number of growers who have not yet grasped the fact that the cotton crop is one requiring special attention if the best results are to be obtained.

Although the value of the crop for 1906 has greatly exceeded that of any previous year, still the yield has been only 170 lb. of lint per acre, practically the same as the season of 1904 when the yield was 169 lb. per acre. The short yield for 1906 is in some measure due to the unfavourable climatic conditions, and to the severe attacks of the cotton caterpillar and other insect pests. But at the same time it must be admitted that fields were to be seen in which cotton had been so thickly planted and on which so many plants were allowed to remain in each hole, that the bolls dropped for want of sufficient light and air; and so long as planters fail to recognize the desirability of giving the cotton plants sufficient space to develop, so long will the results be unsatisfactory.

Again, the majority of planters are not paying sufficient attention to seed selection on their estates. From time to time, both in the *West Indian Bulletin* and in the *Agricultural News*, attention has been called to this very important subject, and cotton growers, not only in Barbados, but in all the West Indian Islands, should consider whether, in their own interest, the time has not arrived when they should make provision to supply themselves with reliable pedigree cotton seed.

In the Sea Islands where the Sea Island cotton has been brought to its present state of perfection, it is found necessary, owing to the variability of the plant, to select seeds from healthy plants bearing a number of bolls in which the fibres are long and fine, and there it is found that, unless this careful selection is carried on year after year, there is a strong tendency for the cotton to deteriorate. For the past three years the Department has assisted a number of the planters to select seed on their estates, and it has further assisted in keeping up the quality of the cotton by making arrangements, in the first instance with the Barbados Central Cotton Factory, and latterly with the Barbados Co-operative Cotton Factory, Ltd., that only seed from the best cotton sent in should be retained for sale to the planters. This, according to the arrangements made, is carefully handpicked so as to eliminate all inferior seeds, as well as all clean black

seeds with sharp spines, from which inferior cotton is obtained, and only plump, well-matured seed, having a green tuft at the end, is retained for sale.

The method of Seed Selection, or, as it is termed in the Sea Islands, 'Pedigree Breeding', although requiring careful attention on the part of those engaged in carrying it out, is not beyond the comprehension of any intelligent cotton grower who desires to practise it on his estate. The first thing to do is to go through a field of healthy cotton, in which there is only one plant growing in each hole, and select about 100 plants free from disease—particularly from anthracnose and 'black arm'—and which are cone-shaped in outline, with numerous lateral branches, having short internodes, with bolls or flowers at nearly each node. To these plants a piece of red tape and a numbered label should be attached. At the same time a tall stake should be placed close to the plant so that it may easily be located. (Ordinary ceiling lathes or portions of hogshead wood-hoops answer admirably for this purpose.) A number of bags, numbered to correspond with the labels on the plants, should also be obtained. The bolls that open first should be discarded as well as those at the end of the picking season, and only the bolls that open during the middle of the picking season should be placed in the bag numbered to correspond with the label on the plant.

At the end of the season the bags should be carefully gone through and the seeds from the plants giving the best results retained. A full description of how the examination of the cotton is made so as to ascertain which plant has given the best results will be found in the *West Indian Bulletin*, Vol. VII, page 153. While on the subject of Seed Selection we cannot too strongly impress, not only on cotton growers in Barbados but those in all the West Indian Islands, the desirability of paying attention to selecting seeds from the best plants for keeping up the quality and yield of the cotton in their district.

The Cotton Industry at this time is not only of great importance to the sugar growers as it enables the planters to pay their way and leave an appreciable balance to the good, but it also enables the planters to inaugurate a system of rotation of crops, by which it should be possible to eliminate from their fields the sugar cane root disease, *Marasmius sacchari*, which at present is so greatly affecting the sugar cane. In addition, the cotton growers are enabled with the seed from their cotton to supply valuable food to their oxen and mules, without having to purchase at great expense food stuffs from other countries, thus cheapening the cost of the upkeep of their animals.



## SUGAR INDUSTRY.

### Manuring Sugar-cane in Jamaica.

An article entitled 'The Rational Use of Manures for Sugar-canes in Jamaica,' by the Hon. H. H. Cousins, M.A., F.C.S., which appears in the recently published issue of the *West Indian Bulletin* (Vol. VIII, No. 1), contains hints of considerable value to cane planters in the island to which it primarily refers, while it is not without interest to sugar growers in other West Indian Islands.

Mr. Cousins points out at the beginning of his article, that on account of the great diversity of soils which exists in the sugar-growing districts of Jamaica, it has not been thought advisable to undertake any elaborate series of manurial experiments with the crop, since results obtained in any particular district could not be taken as applying also to other parts of the island. Manurial experiments have, however, been conducted on various estates, and information of considerable local value has been obtained in this way.

The risky nature of applying fertilizers to the cane crop in neighbourhoods subject to drought is referred to, and experience shows that though this may be a remunerative practice in a good growing season, yet in unfavourable years the manures may accentuate the effects of the drought.

Lime is mentioned as a constituent which appears to be most frequently needed on the Jamaica sugar soils, and observation shows that its application has had a remarkable influence on the yield of canes. About 10 cwt. of lime per acre per annum is the quantity recommended.

Reference is made to the importance of maintaining a suitable supply of humus in the soil. Cattle manure is one source of this, and the growth and subsequent ploughing-in of cowpeas is mentioned as a practice that has been adopted with good results in this way on many estates. Lime and cowpeas, it is stated, are quite sufficient in many cases to ensure a full crop of canes.

Mr. Cousins is inclined to recommend sulphate of ammonia in preference to nitrate of soda as a nitrogenous manure for sugar-canes in Jamaica, since the nitrate is more liable to be washed out of the soil, and also because it is less convenient for mixing with other manures than the sulphate. From 1 to 2 cwt. of sulphate of ammonia per acre is the quantity recommended to be used.

It is pointed out that in most instances application of phosphates is not needed on the sugar lands of Jamaica, since the soil is, in general, peculiarly rich in this constituent. Where phosphatic fertilizers are needed, however, it is recommended that basic slag should be applied to the stiff and medium soils deficient in carbonate of lime, while superphosphate is most suitable on soils containing abundance of lime. On light alluvial soils deficient in lime, the best results have followed the use of 2 parts of steamed bone flour and 3 parts of good superphosphate.

Where potash is needed, the application of  $\frac{1}{2}$  to 1 cwt. of sulphate of potash is mentioned as a profitable method of applying it. Wood ashes, too, are a valuable source of potash.

In connexion with the use of mixed manures by many planters, it is pointed out that the cost of these is very frequently from 10 to 30 per cent. in excess of the cost of the ingredients, a fact which sufficiently indicates the uneconomical nature of this method of purchasing the necessary fertilizing constituents.

### Seedling Canes in Jamaica.

In another paper, prepared for the last West Indian Agricultural Conference, and reprinted in the latest number of the *West Indian Bulletin* (Vol. VIII, No. 1), the Hon. H. H. Cousins, M.A., F.C.S., gives some particulars of the work that has been in progress for many years past in connexion with the introduction of selected seedling canes into Jamaica, and of the results that have attended the trials of the different varieties.

Until recent years, it is stated, the canes grown on sugar estates in Jamaica were practically limited to the White-Transparent or Mont Blanc cane (which may be looked upon as the standard cane of Jamaica), the Bourbon, and the Creole or Ribbon canes. Varieties of cane imported for trial from Martinique in 1871, and from Mauritius in 1883, did not yield very favourable results, and were reported as being inferior to the native canes.

Of several Demerara seedlings introduced into Jamaica in 1892, the variety D.95 has proved the most popular. It does best on light soils with irrigation, but fails where drainage is deficient. The Barbados seedling B. 147, introduced in 1899, has not proved an all-round cane in Jamaica, although it has shown itself to be an excellent drought-resisting variety. Another well-known Barbados seedling, B.208, is referred to as bidding fair to prove the most valuable cane yet introduced into Jamaica.

Systematic work in the selection of seedling cane varieties in Jamaica was begun in 1902, when a preliminary trial of some 100 varieties was made at Hope. The Sugar Experiment Station was started in 1904, and under its guidance these trials have been continued and extended.

Of varieties recently introduced into Jamaica, it is mentioned that the Demerara seedling, D 625, appears to be a cane of good promise, and it is being propagated rapidly at Hope so as to make extensive trials with it under estate conditions.

Mr. Cousins states that over 100,000 tops were distributed from the Sugar Experiment Station at Hope during 1906, and nearly every estate in the island has now received stock of the best canes for trial.

### Sugar Industry in Martinique.

A few particulars are given in the latest *Annual Report* of the British Consul at Martinique as to the extent of the sugar industry of the island.

It is stated that the high prices which ruled after the ratification of the Brussels Convention in 1902 led to an increased area being devoted to sugar-cane cultivation, and the crop of 23,938 tons in 1904 rose successively to 30,186 tons in 1905, and to 42,241 tons in 1906.

Unfortunately, however, sugar prices did not keep up with this extended production, and while the increase of 6,248 tons in the crop of 1905 resulted in an increased value of £183,317, in 1906—although as stated above, the crop was greater by 12,055 tons than in the previous year—there was a decline in value equal to £29,534. The highest prices realized during 1906 did not exceed £12 per metric ton (2,200 lb.) while those of the previous crop reached at one moment £18.

The exports of rum from Martinique increased from 2,014,338 gallons in 1905, valued at £136,647, to 2,496,069 gallons in 1906, valued at £194,288.





## WEST INDIAN FRUIT.

### FRUIT IN HAWAII.

In the *Report* of the Horticulturist at the Hawaiian Agricultural Experiment Station, reference is made to the excellent quality of the fruit grown in those islands. The citrus fruits produced—oranges, limes and lemons—are mentioned as being specially good.

The mango is largely grown in Hawaii, and, in the opinion of the writer of the report referred to, is destined to become one of the most important tropical fruits of the American market in the future. The possibility of shipping the mango in cold storage has already been demonstrated, and while an effort should be made by producers in the West Indies to supply the markets of the Eastern States, Hawaii hopes to produce all that is required in the West.

The mango weevil (*Cryptorhynchus mangiferae*) is reported as being a source of great trouble in Hawaii, and its presence is a serious hindrance to the progress of the industry.

The Experiment Station is making a collection of all the finest varieties of mango trees available, with the intention of propagating them on seedling stocks.

The Bluefields variety of banana, which possesses a thick skin that does not easily discolour, and several other qualities that make it by far the best shipping banana there is (see *Agricultural News*; Vol. IV, p. 149), has received great attention in Hawaii during the past two years, and latterly suckers have been generally distributed throughout the islands. These suckers have been distributed in lots of from two or three to fifty, to growers who undertake to cultivate them in an experimental way, furnishing periodic reports on their growth and production. This banana was introduced into Hawaii on account of the advantages it holds as a commercial product, and because it is the variety best known on the American markets.

The report states, too, that experiments have been made during the past few years with the roselle (*Hibiscus sabdariffa*), a plant known in the West Indies as the red sorrel. The tree appears to do well, and to give good results in Hawaii. As is well known in these islands, excellent jams and jellies are made from the fleshy calyx of this fruit, and from the seed pods, while they are young and tender, and the Hawaiian experiments were undertaken with a view to testing the suitability of the fruit for preserving. It is stated that when grown as a crop, from 6,000 to 7,000 lb. of fruit per acre can be obtained under average conditions. Although the roselle tree will do fairly well in a dry climate, it yields more heavily on the application of

water. The seeds of these plants are sown about March, and the plants are set out in the field when about 6 to 8 inches high, at distances of about 4 feet by 6 feet if the rainfall is abundant, while in dry localities they are set a little closer—4 feet by 4 feet.

### BANANA CROPS AND MANURES.

In that part of his latest *Annual Report* which deals with the field experiments that are being carried on in Jamaica with various agricultural crops, the Island Chemist (Hon. H. H. Cousins, M.A., F.C.S.) makes the following reference to the application of manures to bananas and other crops:—

The experience of the past six years has shown that, in the majority of cases, fertilizers are either not required or are not profitable under the agricultural conditions prevailing in Jamaica in the cultivation of such crops as bananas, citrus fruits, and pine-apples.

It is significant of the independence of the banana growers of any artificial fertilizers for the production of this crop, that although carefully regulated plots were established for five years in succession on several important plantations, in no case was any detailed account of the returns from the plots recorded. If any reliable data as to the financial outcome of the manuring of the banana crop is to be obtained, it is obvious that a weekly record must be kept of the grade and number of bunches cut from each plot. This can only be done by planters themselves who are on the spot. When banana lands are exhausted, the problem of manuring will become one of importance, but for the present I am satisfied that all of our Jamaica lands which are at all suitable for banana cultivation only require humus and drainage to produce the best results. The drain on the soil is apparently small so far as nitrogen and phosphates are concerned, while the large reserves of potash in the soil suffice for the full requirements of the crop.

British New Guinea having passed into the possession of the Australian Commonwealth, a scheme has been drawn up for the agricultural development of the country. There are millions of acres of rich, well-drained, alluvial soil right on the coast. At present this land is covered with forest, but it is stated that the soil is well suited for the cultivation of rubber, cocoa-nuts, and sugar, while the fertile table lands of the interior offer good areas for the growth of coffee, tea, cinchona, and cacao.



BANANAS IN ENGLAND.

The United States Department of Agriculture has recently published a report on the banana trade of the United Kingdom. This subject has frequently been referred to in the *Agricultural News*, but some of the points given below will probably be fresh information to many readers.

The British Islands take larger quantities of bananas than any other European country, but the imports fall far below those of the United States, where, in 1906, the sales reached 35,000,000 bunches. Formerly, the Canary Islands furnished the bulk of the bananas consumed in the United Kingdom, the imports from thence, in 1900, forming about 97 per cent. of the total ; but, in spite of largely increased production in the Canaries, the supplies from those islands have fallen more and more behind the English demand, and in 1906, Costa Rica became the chief source of supply, providing 43 per cent. of the total, while the Canaries took second place, their shipments constituting 37 per cent. of the total English imports.

Details as to the imports of bananas into the United Kingdom during the past six years and the sources of supply are shown in the table given below. The great increase in the West Indian shipments during the past three years is very gratifying.

IMPORTS OF BANANAS INTO THE UNITED KINGDOM--QUANTITY.					
Country.	1902.	1903.	1904.	1905.	1906.
	Bunches.	Bunches.	Bunches.	Bunches.	Bunches.
Madeira ...	19,102	22,075	10,114	4,832	1,690
Canary Islands ...	1,817,533	1,941,472	2,060,330	2,451,966	2,401,118
Costa Rica	...	440,934	1,363,071	2,061,705	2,736,348
British West Indies	967,405	682,883	476,868	1,218,922	1,286,407
Other countries ...	660	152	128	489	141
Total ...	2,804,700	3,087,516	3,910,511	5,737,914	6,425,704

The Canary banana is preferred in England to all other varieties, as being of more delicate flavour. Dealers who do a high-class trade handle this banana almost exclusively, but the cheapness of the West Indian product brings it more within the reach of the masses, and it is with the working-classes especially that banana consumption has made such rapid progress.

AGRICULTURAL CONDITIONS IN COLIMA.

Agriculture in the Mexican State of Colima is stated by the British Vice-Consul to be in a very flourishing condition. Colima is on the Pacific sea-coast, and is reported to enjoy a never-failing rainy season, an abundant supply of water, and a rich and fertile soil. Unfortunately at present, the facilities for transport and exportation of produce are very deficient, and this forms the most serious handicap on the industry, one of the results being that a very large area of fertile land is still left untilled. The principal agricultural products are sugar, rice, alchohol, indigo, cotton, cacao, coffee, oil-nuts, beans, and corn. The following extracts from the Report gives further details :—

Sugar is grown very extensively throughout the state, and there being plenty of water for irrigation, does very well. The annual production is estimated at 2,300,000 kilos., worth 17c. per kilo. [1 kilo. equals 2·2 lb.]

A very large amount of rice of a very good quality is grown annually. Lack of transport prevents a still larger crop. The annual production is estimated at 3,450 metric tons, worth 10c. per kilo.

Some thirty years ago there was a very large production of cotton in the state, but the cultivation of this plant has been allowed to decrease and deteriorate to such an extent that the present production is quite small. The amount grown is almost entirely consumed by two local factories. The annual production is estimated at 150,000 kilos., worth 50c. per kilo.

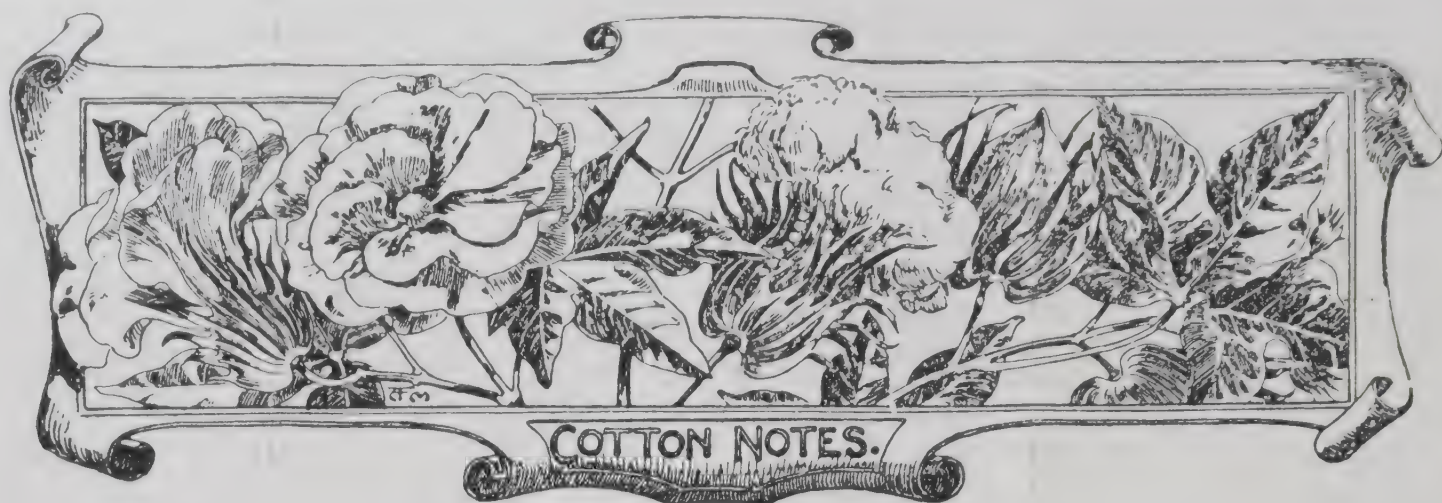
Only a small amount of cacao is grown, little more than sufficient for local consumption. Production, 300 kilos., worth \$1·40 per kilo.

The finest coffee grown in Mexico comes from the state of Colima, the famous ‘Caracolillo’ attaining perfection on the slopes of the volcanic range. There is a steady and ever increasing demand for it, and with better transport facilities, the amount exported annually could be easily quadrupled. Coffee planters are steadily increasing their plantations, but the demand even now is ahead of the supply in spite of high freight charges. Annual production, about 230,000 kilos., worth from 43c. upwards per kilo.

The palm trees which produce palm oil are the most easily cultivated and prolific of the palm trees. There is a steadily increasing demand for the oil, more especially for the manufacture of soap. The trees begin bearing at five years of age and from seven years of age on bear indefinitely. Practically no cultivation is required. Annual production, 283,000 kilos., worth 42c. per kilo.

A small quantity of beans is grown in the higher parts of the State, but not enough to supply the local demand, with the result that the price has more than doubled in the past year. Annual production, 2,000 hectolitres, worth \$12 per hectolitre. Indian corn or maize, is one of the greatest products of the State, but, owing to lack of transport facilities, the price varies very much in different parts. The land being owned as a rule by large landholders, only a certain quantity is planted, with the result that, owing to the floods of October 1906, which destroyed a large quantity of the crops, the price has more than doubled. There are two crops grown every year, one being harvested in November at the end of the rainy season, and the other in April. The latter is grown entirely by irrigation. The annual production is estimated at 250,000 hectolitres, worth \$5 per hectolitre.





### WEST INDIAN COTTON.

Messrs. Wolstenholme & Holland, of Liverpool, write as follows, under date of October 28, in regard to the sales of West Indian Sea Island cotton:—

During the last fortnight a moderate business has been done in West Indian Sea Island cotton, and prices are in buyers' favour in sympathy with the lower quotations at which the American Sea Island is being offered.

The quotations of the latter are 1*d.* to 2*d.* per lb. lower, but as the bulk of the receipts appear to be composed of the lower grades, we think that West Indian will, this season, command good prices.

The sales of West Indian Sea Island amount to 170 bales, and include Barbados, 18*d.* to 22½*d.*; Antigua, 16½*d.* to 22*d.*; and St. Croix, 17*d.* to 19*d.*

### AWARD OF GOLD MEDAL AT MONTSERRAT.

The Gold Medal, offered by Sir Alfred Jones, K.C.M.G., President of the British Cotton-growing Association, for competition amongst the large growers at Montserrat, has been awarded to Mrs. Laura Howes, of Trants estate. Other large growers in Montserrat were ineligible for competition. The Silver Medal for small growers is proposed to be awarded on the results of the crop of the coming season.

### SEA ISLAND COTTON REPORTS.

In their Sea Island cotton report, dated October 12 last, Messrs. Henry W. Frost & Co., of Savannah, refer as follows to the crop conditions in Georgia:—

The supply of good, bright cotton is small, and the impression is that the larger portion of the receipts will continue to be of the lower grades for some time in consequence of continuous rains during the past fortnight.

On October 19, still referring to the Georgia crop, they write:—

The general character of the crop is grey, showing the effects of rain, so that it is impossible to secure the brightness and bloom of last year's shipments at the opening of the season. We hope with a continuance of the present good weather that we may in time see some improvement.

On the same date, referring to the Sea Island crop in Florida, they say:—

The receipts continue very small. So far the quality of cotton has been disappointing both in staple and strength.

We hope we may see some improvements resulting from the recent good weather.

The report of Messrs. W. W. Gordon & Co., of Savannah, dated October 18, contains the following note:—

The weather during the past week was generally fair and favourable to picking. Complaints of lack of labour were received from nearly every section of the Sea Island belt. The cotton receipts during the week showed the effects of the recent rainy weather. The percentage of bright cotton was very small.

### COTTON IN ST. VINCENT.

Mr. W. N. Sands, Agricultural Superintendent of St. Vincent, writing under date of November 4, sends the following particulars in further reference to the present season's cotton crop in the island (*Agricultural News*, Vol. VI, p. 342):—

In continuation of previous correspondence on the prospects of this season's cotton crop at St. Vincent, you will be pleased to learn that no further attack of the cotton worm has been reported.

The cotton planted in June and July is ripening rapidly, and cotton picking is now quite general.

It is expected that ginning will be started at the Central Factory in a day or two, as several growers have considerable quantities of seed-cotton on hand. Mr. C. J. Simmons has already ginned 3 or 4 bales.

We have had a very good season so far, the rainfall being about 16 inches less than that experienced last year—a good thing, as in most districts the rainfall is usually rather too heavy, and only very moderate yields of cotton are obtained.

Taken together, cotton prospects continue very promising, and these prospects should be realized, provided the November rainfall is not in any way excessive.

### COTTON CULTIVATION.

The hints given below as to the methods of cultivation which may be adopted with advantage in the treatment of the young cotton crop are taken from an interesting and practical article, entitled 'Cotton Cultivation', which appeared in the October number of the *Cotton Trade Journal*:—

The cotton plant should be thinned to the final stand as quickly as possible, and all efforts should tend to this end. After the plants have been thinned to such final stand, cultivation should be mainly shallow and often repeated, the



immediate object being to prevent evaporation of soil moisture by keeping the surface as nearly as possible always broken and mellow. 'Once a week and once to the row' with a good horse cultivator, is an excellent rule.

This rapid cultivation encourages a vigorous and healthy growth of the plants, and should be continued up to about the time the blossoms begin to appear freely and the plants shall have commenced to put on 'fruit'. These early blooms—that appear during the third month after planting—are to produce the early bolls and yield the early pickings of cotton. If the soil be stirred at all during the period of rapid blooming, the work should be done very carefully, the cultivators running very shallow. What is now wanted is rapid blooming, not fast growing, and the certain retention and development of the bolls. Injudicious cultivation at this period, especially if at all deep, tends to encourage weed development and loss of young fruit ('shedding'). Late cultivation tends to large growth of weed and a late crop of cotton, and may be in order when the main object is to secure the largest possible total yield, regardless of earliness.

Every planter has noticed the great increase in shedding which often occurs within a few days after a heavy rain in July followed by hot, sunny weather. Many careless observers think the 'forms' thus thrown off have not yet quite reached the bloom. In this notion they are in error, since it is a fact that a great majority of the supposed forms that have been dropped are young bolls only a few days from the bloom. Many such young bolls doubtless drop because of a failure of pollination due to constant rain or damp weather. But such shedding of young bolls is often noticeable immediately following a rather deep cultivation, even when weather conditions are favourable to pollination. Indeed, deep cultivation in July is sometimes resorted to by skilful farmers in order to encourage a further and larger development of the plant. The removal of every boll and form from selected plants as late as July 4 has been known to result in an immediate resumption of growth and a larger yield of cotton from the plants thus treated than from the adjacent plants that were not so treated. So, it seems, a loss of forms and immature bolls by actual manual removal may induce and promote renewed growth of the plant; and, conversely, the renewed growth, when induced by abundant rainfall and sunshine, or by deep cultivation, causes the shedding of undeveloped fruit.

### MOISTURE IN COTTON.

The question of moisture in cotton is, among other points, discussed in a very valuable little publication 'Sea Island Cotton,' forming *Farmers' Bulletin*, 302, of the United States Department of Agriculture. It is pointed out that either an excess, or a lack, of moisture in the fibre reduces the grade of the cotton, and the process of 'bulking' is referred to in this connexion, a practice which has been followed with great advantage by some growers in Barbados. To quote from the pamphlet in question:—

An element of waste from the spinner's standpoint is the moisture which evaporates during the process of manufacture. This moisture may be excessive in cotton picked early in the season and ginned without drying. There may, on the other hand, be a lack of moisture. The cotton may be over-dry and may appear to be harsh and brittle. Such cotton gives trouble in spinning, because of the electric current which it develops.

The question of moisture is one of the most important

connected with the handling of cotton. Either an excess of moisture or lack of it reduces the grade. The planter, however, must never add water to the cotton, but he should seek to retain the optimum amount of natural moisture. This means that to drive off excessive moisture, freshly picked cotton should be sunned until the seeds will crack in the teeth. The staple will then be slightly over-dry and unfit to gin, or offer to the buyer. To restore its grade it should be 'bulked.' Bulking, as practised on the Sea Islands, consists in placing the cotton seed, after sunning, in a large, deep, square pile in a cool room. It should be packed down solidly and, if the air is dry, covered with blankets or boards, and left from three to six weeks before ginning. When it comes out of bulk the staple has lost its harsh feeling, and is soft, oily, and glossy.

Care must be taken never to bulk cotton that has not previously been well dried, or the pile will heat. On the other hand, a loose conical pile, formed by throwing seed-cotton into a store-room, is not a bulk, for it does not prevent the cotton from drying out still more. As a rule, cotton brought to the gins early in the season is too green and damp, and needs sunning to put it into condition, while that coming in late or taken from the storehouses during the winter is over dry and consequently harsh and brittle. Both the lint cotton, and the thread spun from it, lack their full strength if too dry. Everyone knows how a dry twig will snap in the fingers, while a green one only bends. The same to a less degree is true of the cotton fibre. The quality is best maintained, however, by avoiding over-drying rather than by the addition of moisture.

### WEST INDIAN BROOM CORN.

The *Voice of St. Lucia* of October 17 last contained the following note with reference to samples of broom corn straw from two of the West Indian Islands displayed at the recent Toronto Exhibitions:—

Two specimens of broom corn straw were sent from the West Indies to the Toronto Exhibition, one being from Antigua and the other from Montserrat. Both samples were pronounced by experts to be excellent. The Montserrat article was preferred, however, as better fulfilling the conditions required. The exhibit from Antigua was less compact and more weedy. The Montserrat straw would fetch the highest market price, as it was superior to Louisiana, which fetched in Canada \$110 a ton, while \$85 was the highest price commanded by broom corn straw from Oklahoma.

### KOLA IN SAMOA.

In the recently published *Consular Report* on the trade of Samoa for the year 1906, the accompanying reference is made to the cultivation of kola in the island:—

Kola is being planted by two or three farmers, but as it does not appear to thrive when much higher than 400 feet above the sea-level, and is not of any commercial value, being only worth in Liverpool at the present time about 2d. per lb., it offers comparatively little inducement to cultivate. Besides this, the extent to which it is used in Europe being unknown, it appears possible that there may eventually be no certain demand for it at all. In Samoa the trees begin to bear in seven years from the date of planting. Any information from business firms regarding its probable future demand in Europe, and the prices likely to rule, would be welcomed by British planters and others here.



## EDITORIAL NOTICES.

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# Agricultural News

VOL. VI. SATURDAY, NOVEMBER 16, 1907. No. 145.

## NOTES AND COMMENTS.

### Contents of Present Issue.

An account is given in the editorial of the progress of the cotton industry in Barbados since 1902, when it was first started. It will be seen that the extension which took place in the area planted, and the increase in the produce exported, during 1906-7, are especially satisfactory. The importance of using only selected seed in planting is dwelt upon in this article.

The articles dealing with the sugar industry (p. 365) relate to the experimental work that has been carried on in Jamaica of late years in connexion with the manuring of the sugar-cane crop and the trials of seedling canes. There is also a note on the industry in Martinique.

Information relating to the fruit growing in Hawaii, as well as interesting particulars concerning the banana trade of England are given on pp. 356-7.

The cotton pages (358-9) contain useful hints on methods of cultivation, a brief article on moisture in cotton, in which the practice of bulking is referred to, as well as notes on crop prospects in St. Vincent, award of gold medal at Montserrat, etc.

The results of a series of pig-feeding experiments carried on in the United States indicate that corn-meal is more economical than whole corn as a fattening food (p. 363).

Interesting information relating to the cacao industry in Trinidad, and a note on the cultivation of this crop in Samoa will be found on p. 366.

### The Cultivation of Turmeric.

The *West India Committee Circular* of October 15 quotes a writer in the *Madras Mail* as recommending the cultivation of turmeric (*Curcuma longa*) as a suitable catch crop on young rubber clearings.

The turmeric plant belongs to the ginger family, and resembles ginger both in appearance, and in the method of cultivation it demands. It is stated that under ordinary circumstances a crop of 2,000 lb. of roots may be expected from each acre planted. Turmeric is used as a dye and for the purpose of giving the yellow colour to varnishes. It is also used in the preparation of curries. It occurs in commerce in the form of fingers and as bulbs. The price of good Madras finger turmeric is about 17s. 6d. per cwt., while Cochin split bulbs are mentioned as having little more than half this value.

### Banana Trade in France.

In connexion with the brief article which appeared in the *Agricultural News* of October 19 last (Vol. VI, p. 324), as to the banana trade in France (where this fruit has become very popular) and the advisability of an attempt on the part of producers in the British West Indies to cater for this market, it is a gratifying circumstance to growers of fruit that the French steamer *Guadeloupe* took a trial shipment of Trinidad bananas to France on her last return voyage.

The *Port-of-Spain Gazette*, commenting on this, points out the great possibilities of trade that may arise from this small beginning. The *Guadeloupe* and its sister ship the *Perou* are very fast boats, and have considerable storage capacity. Trinidad is always included in the itinerary of the line to which these vessels belong, and since neither Martinique nor Guadeloupe have made any efforts to establish a fruit trade with France, and to meet the increasing demand for banana supplies which exists in that country, the opening seems favourable to the British colony.

### Lime as a Fertilizing Agent.

The action of lime as a fertilizing agent is perhaps not generally well understood, and under those conditions harm frequently follows its indiscriminate application. Lime must be looked upon as a plant food, since it enters into the composition of every form of vegetable life, but there are few soils which do not contain this constituent (in some form) in sufficient quantity for the needs of the plants growing upon them. It is seldom then that lime needs to be added to the soil as a simple manure, but it is in its influence as an indirect fertilizing agent that its greatest value lies. All soils contain animal and vegetable matter in various stages of decay. This decay is necessary before the contained elements of plant food are rendered available for use. Lime, in its caustic condition, is one of the most powerful agents of decomposition, and an application of it to sour land, where organic matter does not readily decay, often works wonders. On heavy lands, also, the action of lime is an important aid to fertility, causing the soil to become friable, and thereby giving free access to air and water.



### Economic Value of the Prickly Pear.

The *Government Gazette* of Turks Island drew attention sometime ago to the fodder value of the prickly pear during periods of exceptional drought.

This matter has also received the attention of the United States Department of Agriculture, and two pamphlets, Nos. 74 and 91 respectively, have been issued on the subject of the Prickly Pear and other Cacti as food for stock.

In districts not subject to drought this plant is a useless intruder, and notes as to the best methods of eradicating it have appeared in past numbers of the *Agricultural News*. In Texas, however, it is reported that the prickly pear has proved the salvation of many ranchers during exceptionally dry summers, keeping the cattle alive when no other food was available. It is reported too, that in the same State, the leaves are much valued as a food for milking cows in winter and in dry seasons when other green food is not easy to obtain, since, on account of their succulence, these leaves tend to increase the milk yield.

The plant is also sometimes given to pigs, sheep, and goats, but in all cases care should be exercised to destroy the spines, which are very injurious.

In dry districts of Australia, prickly pear is prepared for the cattle by mixing with bran and steaming for several hours in a large tank. This process renders the spines innocuous. The spines may also be singed off by turning quickly over a good fire, or the leaves may be chopped so small that all danger is removed in this way.

### Cane and Beet Sugar in Great Britain.

The great extension of the beet-growing area in Europe during past years under the bounty system which has prevailed in many continental countries, the large increases in the beet sugar imports into England during this period, and the consequent falling-off in cane sugar imports from the British West Indies and other cane-growing colonies, are dwelt upon at considerable length in the recently published Volume VII of the Report of the Tariff Commission. It is pointed out that in twenty-five years the German area under sugar-beet has nearly trebled, while the Belgian area has nearly doubled during the same period; the Austrian area has more than doubled in twenty years; and the French acreage has increased 10 per cent.

Not only do these European countries now produce the greater part of the sugar consumed in the British Islands, but the larger portion of the beet sugar imports consists of refined sugar, which means that the British sugar-refining industry is being pushed out by foreign competition.

With respect to the importation of raw cane sugar from the West Indies to Great Britain, the figures given show that the shipments are little more than one-third of what they were twenty years ago. In 1885, as much as 1,400,000 cwt. of sugar were sent from these islands to England, while in 1903 the quantity had fallen to 450,000 cwt. The English imports from British Guiana fell from 1,300,000 cwt. to 220,000 cwt. in the same period.

### Agriculture in Bolivia.

Some interesting particulars relating to agricultural conditions in Bolivia are contained in a recent British *Consular Report* on the republic.

It is estimated that the lands suitable for cultivation form about 10,000,000 acres, which, however, is a very small percentage of the total area.

At present the chief agricultural export is rubber, which is shipped to Europe in large quantity. The amount exported in 1905 reached 4,250,000 lb. In one region alone, it is considered the number of rubber trees is not less than 50,000,000. Each tree produces annually from 3 to 7 lb. of rubber. The output of this product will undoubtedly be largely increased with improved facilities of internal communication.

Cacao, coffee, quinine, and sugar are also grown in fair quantity, but local consumption and small shipments to Chile and the Argentine account for the total production of these crops.

About 750,000 lb. of sugar are annually produced in the Department of Santa Cruz, but the methods of extraction and preparation of this product are very crude.

### West Indian Bulletin.

The first number of Volume VIII of the *West Indian Bulletin*, just issued, contains a list of the representatives attending the West Indian Agricultural Conference held at Jamaica in January last, together with an account of the proceedings that had already taken place when the meeting was so tragically brought to a premature close.

The papers relating to the sugar industry, that were to have been read at the Conference, are reprinted in this number of the *Bulletin*. Two of them, prepared by the Hon. H. H. Cousins, M.A., F.C.S., and dealing respectively with seedling canes and with the manuring of the cane in Jamaica, are summarized on another page in this issue of the *Agricultural News*.

Dr. Francis Watts, C.M.G., contributes a valuable paper embodying the latest results that have been deduced from the trials with different varieties of cane and the manurial tests that have been carried on in Antigua and St. Kitt's for several years past. There is also an equally interesting paper by Mr. J. R. Bovell, F.L.S., F.C.S., on the Barbados sugar-cane experiments. In an article entitled 'Breeding Hybrid Sugar-canes,' Mr. F. A. Stockdale, B.A., discusses the scientific principles upon which the results of experiments in crossing different varieties of plants depend (Mendelism), and shows how these principles are being applied to the improvement of the sugar-cane in the West Indies.

The 'Nitrogen Cycle and Soil Organisms' is a very interesting article, by Mr. S. F. Ashby, B.Sc., giving an account of the work of organisms in the soil in rendering nitrogen available as a plant food.

A paper dealing with Mechanical Tillage in Antigua, by Dr. Watts, C.M.G., another on the Polarimetric Determination of Sucrose—again by Dr. Watts, in conjunction with Mr. H. A. Tempany, B.Sc.—and a third, by the Hon. H. H. Cousins, containing a good deal of valuable information on the subject of Jamaica Rum, complete the list of articles.





## INSECT NOTES.

### Cotton Boll-worms.

Any caterpillar which injures cotton by burrowing into the bolls may be called a boll-worm. In the United States of America, however, the name is restricted to one species, *Heliothis obsoleta*, which is a very destructive pest of cotton. This insect occurs in the West Indies and was reported as attacking the cotton crop in Antigua and Barbuda during 1906. During the past few weeks this pest has again appeared in Antigua and has been found in small numbers in Barbados.

Cotton in Barbados has been attacked in a similar way in previous years by the 'corn ear worm,' and during the present season this pest has appeared in sufficient number in the cotton fields of certain estates to cause some alarm.

These two insects are similar in habit and in their manner of attacking both corn and cotton, but differ considerably in appearance.

An account, with illustrations, of the corn ear worm appeared in the *Agricultural News* (Vol. IV, p. 90). The illustrations are reproduced herewith.

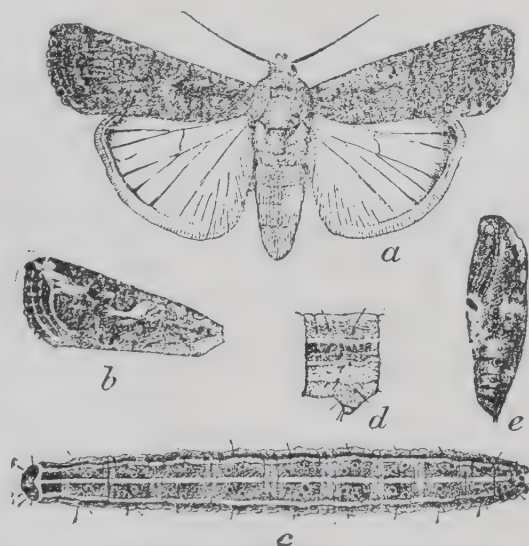


FIG. 27. The corn ear worm: *a*, moth, plain gray form; *b*, fore-wing of more ornamental form; *c*, larva extended; *d*, abdominal segment of larva, lateral view; *e*, pupa, lateral view; *d* is twice natural size; others enlarged one-fourth.

The moth which produces the corn ear worm is a night-flying insect. It is variable in colouration; in one form the forewings are dull grayish-brown above; in another they are darker, and resemble more the coloured pattern shown in Fig. 27, (*a*).

The caterpillar is shown at figure 27 (*c*). When full-grown it is about  $1\frac{1}{2}$  inches in length. The ground colour varies from dull-yellowish brown to black, more or less streaked with dull yellow. Three thin stripes of pale yellow extend along the dorsal surface, the middle one being nearly straight and the two side ones slightly sinuate.

The pupa is generally to be found in the ground though

sometimes in the ear of the corn. It is about  $\frac{5}{8}$  inch in length and mahogany-brown in colour.

The moth of the boll-worm differs from that of the corn ear worm in being much lighter in colour, and somewhat larger in size, measuring about  $1\frac{1}{4}$  inches to  $1\frac{3}{8}$  inches across its outspread wings.

As stated above, the corn ear worm and the boll-worm are similar in their habits. Corn is the food preferred by these insects, and attacks on cotton generally follow severe attack on corn in the same neighbourhood.

The first indication of the presence of the pests is the ragging of the young, tender leaves in the centre of the corn plant; later, the attack extends to the ears.

On the cotton they are seldom, if ever, noticed until they attack the bolls, in which they tunnel, destroying all the interior. Bolls of all stages of growth are attacked, from the small flower-bud to the boll which is nearly full-grown.

The fact that corn is preferred by both these insects as a food plant, naturally suggests that this preference on their part may be used for their destruction. The eggs of the corn ear worm are laid in clusters of from fifty or sixty to 300 or more, on exposed surfaces of the leaves of corn or cotton.

The eggs of the boll-worm are laid singly on the leaves, tassels, and silks of young corn, and on the cotton plant. Probably eggs are deposited on many other plants, as the boll worm is one of the most general feeders known among insects.

In order to control the boll-worm by the use of Indian corn as a trap crop, it will be necessary to have the corn planted near the cotton so that the corn will have put out tassels and silks by the time the first bolls are forming on the cotton.

If this is done, it is probable that nearly all the eggs of both the corn ear worm and the boll-worm will be laid on the corn plants. The caterpillars may be destroyed in two ways—the corn may be cut and fed to the estate stock, or the following method which has been found useful in Florida may be tried:—

'When the caterpillars are feeding in the crown of the plant, they may be poisoned by a mixture consisting of half a teaspoonful of Paris green thoroughly stirred with 1 quart of cornmeal. This may be applied by means of a sprinkler made by punching a large number of fine holes in the bottom of a tobacco tin and shaking the poisoned meal from it into the crown of the plant. This would probably prevent serious injury to the leaves, and by reducing the number of the moths in the succeeding brood protect the ears, to a large extent.'

If corn is planted as a trap crop, it must be cut before the insects are full-grown or they must be poisoned. Merely to plant corn near cotton, and then to leave it, would be to furnish an extra breeding place for these pests; and would tend greatly to increase their number.

### Names of Insects.

In an article on 'Grasshoppers' in a recent number of the *Agricultural News* (Vol. VI, p. 218) reference was made to the short-horned grasshopper or locust which is found at Cedros, Trinidad.

A specimen of this insect, and one of the guava lobster, (see *Agricultural News*, Vol. VI, p. 234) were submitted to Mr. J. A. G. Rehn, who has kindly identified them.

Mr. Rehn writes:— 'I find the large grasshopper to be *Tropidaceis dux* (Drury), a species widely distributed through Central and South America, and ranging north to Texas. The large Phasmid is *Diapherodes gigantea* (Gmelin), female, which has previously been recorded only from St. Vincent and Guadeloupe.



## PIG-FATTENING EXPERIMENTS.

In view of the enormous use of maize as a food for fattening pigs in the United States, a series of experiments has been conducted at the Wisconsin Agricultural Experiment Station, during the last ten years, with the object of determining whether it is more economical to give the food in the form of whole corn or as cornmeal. The results of the trials are given in *Bulletin* 145 of the University of Wisconsin.

As it is stated that experience has shown that corn, either whole or ground, when it forms the sole food of pigs, gives unsatisfactory results, the maize was supplemented with other foods, such as wheat middlings and skim milk.

The experiments in question include trials with no less than 280 pigs, belonging to the Poland-China, Berkshire, Duroc-Jersey, Yorkshire, Chester White, and Razor-back breeds, as well as crosses of these varieties with one another. One half of the pigs received whole corn as the principal part of their ration, the other half receiving cornmeal.

The table of results gives particulars as to weight of pigs at beginning of trials, length of fattening period, amounts of food eaten, the gains in weight, and also the respective amounts of corn and meal consumed in the several experiments for every 100 lb. of gain in weight by the animals.

The mean results of ten years appear to indicate that the advantage is somewhat in favour of the meal, only 471 lb. of this being required on the average, to produce 100 lb. gain in live weight, while 501 lb. of whole corn was the average quantity required to bring about the same increase.

There are, however, some slight inconsistencies in the figures, and it would appear that true economy in feeding does not depend so much upon whether whole corn or cornmeal is used, as upon the formation of a suitable ration by the judicious admixture of other foods with the maize. Thus, where shelled corn and cornmeal respectively were fed alone, with no addition, no less than 738 lb. of whole corn, and 820 lb. of meal were required to produce 100 lb. gain of live weight. On the other hand, when both the corn and the meal were mixed with an equal quantity of wheat middlings, and a little skim milk was given in addition, only 360 and 366 lb. respectively, of these mixed foods were required to produce 100 lb. of live weight.

Such foods as wheat middlings would not be available in the West Indies for adding to a fattening ration, but the pig fatterer who wishes to obtain the best and most economical results would vastly improve a purely maize ration by the addition of 1 part of such a food as cowpeas in the form of meal to 2 parts of corn (by weight).

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## THE VALUE OF MULCHING.

The *Journal of the Jamaica Agricultural Society*, in its September number, draws attention to the great benefits derivable from the process of mulching the soil, more especially in a season of such severe drought as has been recently experienced in Jamaica. The writer instances one case at Kendal, where about 6 acres of bananas were planted last season. Previous to planting, the land had received one deep ploughing, and the area had since been well mulched with banana trash. This year, while everything else in the neighbourhood suffered severely from the drought, the

banana trees in question kept green and fresh throughout the season, and yielded excellent crops of fruit, bearing witness to the good effects of mulching in the preservation of moisture, and in the promotion of soil fertility.

The following is an extract from the article in the *Journal* :—

For nine-tenths of the land cultivated in Jamaica, and for our principal and most vital crops—bananas, cacao, coffee, and cocoa-nuts, whether growing by the seaside, on the hillsides, or in the narrow valleys, the most suitable method of conservation of moisture, and of increase of fertility, is mulching. It fulfils every purpose served by surface cultivation, and, in addition, does a great deal more, at less expense in the end. After one deep preliminary forking, the trash is applied; it depends upon the kind of material used whether it need to be deep; if soft grass is used, it will disappear in three months in some wet districts (but still be in the soil as manure and so not wasted), but if tougher stuff, like banana trash, is used, it lasts for over a year at least. It is not too much to ask that every October and November, fields of banana and cacao, or whatever kind of staple crop is being grown, should be mulched, or that mulching should be gradually renewed in slack times. It can hardly be impracticable to procure mulching material if people are willing to use it. There are first, the piles of banana trash to be seen at almost every delivery depôt; there is the large area of uncultivated bush-land existing on almost every estate which could be used for growing mulching material, and where, indeed, such material will generally be found already; and there is the careful penning of every animal used on the estate for the saving of manure.

Ploughing- or forking-in heavy crops of cow peas is admirable, but this is for field crops when the plants are young; it is excellent, as a preliminary cultivation before the mulch is supplied. For established bananas and cacao, or any permanent crops, a heavy mulch is at once the most economical and useful method of cultivation, keeping down weeds, conserving moisture, and adding to the fertility of the soil at one time, and also preventing plant food from being washed out of the soil. Weeding is the biggest item of expense of cultivation, and the most frequent source of loss in the tropics, as so much damage is often done by labourers to staple crops, such as cacao, coffee, and oranges, in the forking and weeding.

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## DEPARTMENT NEWS.

The Imperial Commissioner of Agriculture, who has been making an official tour of the Northern Islands on his return from Canada, arrived at Barbados by the S.S. 'Parima' on Tuesday, November 12. Sir Daniel Morris left again for Demerara, however, on the same day, by the R.M.S. 'Esk.' He is expected to return to the Head Office on Tuesday, November 19.

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Mr. C. Somers Taylor, lately Assistant Chemist in connexion with Sugar-cane Experiments, and attached to the Government Laboratory at Barbados, has been appointed to a post in the Indian Agricultural Service, on the recommendation of the Imperial Commissioner of Agriculture. Mr. Somers Taylor was to have sailed for Bombay at the end of October last.





## GLEANINGS.

The cane-sugar crops for 1906-7 are estimated to be 12,195,546 tons, as against 12,147,521 tons in 1905-6 and 9,513,262 in 1904-5. (*Maritime Merchant*, October 17.)

Florida oranges of the coming season are reported to be of good size, and promise to be large. It is said, however, that the crop will be 25 per cent. shorter than last year. (*Maritime Merchant*, October 17.)

Mr. Joseph B. Dopwell, foreman at the St. Vincent Botanic Station, has been appointed as Plant Instructor on the staff of the Agricultural Department of East Africa, at a salary of £130, rising to £150, with free quarters, etc.

Rats are causing very great damage among the cacao plantations of Samoa. They have, however, been removed from many estates by the use of arsenic and strychnine, and the Danysz virus has also given good results with some planters. (*British Consular Report*, 1906.)

During the month of October the total amount of local produce exported from Trinidad reached 9,772 bags of cacao, 3,543 bags of sugar, and 98 puncheons of molasses. There were also transshipments of 3,025 bags of cacao and 245 bags of coffee from Venezuela. (*Port-of Spain Gazette*, Nov. 2.)

The *Dominica Guardian* reports that shipments of oranges of good quality have been recently made to England, New York, and Canada from the island. In common with cacao and limes, the present season's crop of oranges promises to be a good one.

A considerable shortage in the copra and cocoa-nut oil exports from Ceylon is reported as having occurred during the first six months of 1907. The fall in the shipments of copra amounted to 40,027 cwt., and of cocoa-nut oil to 61,833 cwt.

The Directors of the Barbados Cotton Factory, Ltd., have decided that while they will continue to supply planters in Barbados with selected Sea Island cotton seed at the rate of 6c. per lb., in future 8c. per lb. will be charged to buyers in other British West Indian Islands, and 12c. per lb. outside these islands.

The cacao crop of 1906 in Martinique reached 1,040,373 lb., this being a small increase on the crop of 1905, which was 1,003,183 lb. Owing to the higher prices which prevailed in 1906, however, the increased value of the crop was £6,388 over that of the previous year. (*British Consular Report*, 1906.)

The area of Sea Island cotton planted in Antigua in 1905 was 400 acres; in 1906 this had increased to 670 acres, and the area is again extended this year. The yield in 1906 was 53,550 lb. of cotton, which realized from 24c. to 25c. per lb.

Cashew nuts were among the West Indian products which attracted a good deal of attention at the recent Toronto Exhibition. The *Belize Clarion* reports small exports of cashew nuts to England, where also, it is stated, this product is gaining in popularity.

Cotton cultivation is largely carried on in the Brazilian State of Pernambuco, about 30,000 bales being produced annually. The manufacture of oil from cotton seed is also a flourishing industry, the oil readily commanding a good price in Rio de Janeiro and Sao Paulo. (*British Consular Report*, 1906.)

In view of the approaching crop seasons there is now special activity in the Barbados horse and mule markets. On November 3, eighteen horses and ninety-six mules arrived at Bridgetown from Monte Video. Last year, the price for horses was \$120 to \$150, and for mules, \$150 to \$180, and it is anticipated that equally good prices will be obtained this year.

The United States Banana Company, which has a very large paid-up capital, is the latest body organized to grow bananas in the Mexican republic. This company has 2,500 acres of land in southern Mexico, and it is stated that the location and the soil are excellently adapted for the purpose. (*Mexican Investor*, October.)

A return recently issued in England gives particulars of the tide of emigration from Great Britain to Canada that is at present in progress. From this it appears that while in 1902 the number leaving for Canada was 26,000, it bounded up to 59,000 in 1903, to 69,000 in 1904, to 82,000 in 1905, and to nearly 115,000 last year.

Efforts to grow rice in Venezuela have been attended with success, but owing to poor means of transportation, it does not pay to grow more in any district than can be consumed locally. It is stated that on this account, a mill owner at La Guayara finds it cheaper to import wheat from the United States and to pay duty, than to bring it from Western Venezuela. (*Mexican Investor*.)

The agricultural crops of Nicaragua consist chiefly of coffee, bananas, sugar, cacao, and tobacco. The cacao is reported as being of very good quality. Maize, beans, and rice are also grown for home consumption. Rubber is also collected in the mountain forests, and young plantations of rubber trees have been made on the coast. The forests of Nicaragua are stated to contain large quantities of valuable timber trees. (*British Consular Report*, 1906.)

Ginger is produced on a fairly large scale in the Shizuoka prefecture of Japan. Last year the area devoted to the crop was 8,025 acres, the value of the produce being \$95,625. The dried ginger is exported chiefly to the United States. More skilful methods have lately been applied to the cultivation of the crop, and producers are stated to be doing their best to improve the quality so as to be able to compete with West Indian ginger on equal terms. (*Canadian Department of Trade & Commerce Weekly Report*.)





**BRITISH GUIANA: ANNUAL REPORT ON THE BOTANIC GARDENS, 1906-7.** By A. W. Bartlett, B.A., B.Sc., Government Botanist.

This report contains a good deal of interesting information with regard to the various plants and crops that are being raised at the Botanic Gardens. Special efforts have been made during the past year to meet the demand for rubber plants that has arisen in the colony; for this purpose over 58,000 Para rubber seeds were sown, but only about 8,000 plants were raised from this number. The seeds which germinated best were obtained from Singapore and arrived by parcel post packed in tins of charcoal. The young Para rubber plants grow very quickly, and when once potted in baskets, appear to be very hardy and give little trouble. Castilloa and Funtumia rubber trees have also been grown on an experimental scale. The native rubber trees, belonging to the *Sapum* genus, three species of which occur in British Guiana, have also received attention, and seedlings are being raised in the nurseries.

The observations as to the merits of different varieties of bananas, begun a few years ago, have been continued during the past season, and trials have been made of several forage crops, such as Egyptian clover, velvet bean, and saccharine sorghums. A large number of kitchen garden crops are mentioned as having been tried during the past year, but these trials did not give very satisfactory results on account of the heavy rains experienced for a large part of the season. Among the crops tested were onions, carrots, beet, lettuce, tomatoes, cabbage, bush gourd, goa bean, and green pea.

Among the plants that have flowered at the Botanic Gardens during the past year is mentioned a specimen of the Coco-de-mer, or double cocoa-nut (*Lodoicea seychellarum*), only thirteen years old. This tree is stated not to flower, as a general rule, before reaching thirty years of age. During the past year, too, an example occurred for the first time of a Talipot palm (*Corypha umbraculifera*) flowering in the Botanic Gardens.

**JAMAICA: ANNUAL REPORTS OF BOARD OF AGRICULTURE, DEPARTMENT OF PUBLIC GARDENS AND PLANTATIONS, AND OF THE ISLAND CHEMIST, 1906-7.**

*Board of Agriculture.* The operations of the Sugar Experiment Scheme of 1903 have been carried on during the past year. A sum of £300 has been expended on taking out patents for the protection of the high ether rum process, invented by the Island Chemist.

*Agricultural Experiment Work.* Experiments with a large number of crops—sugar-canes, tobacco, cassava, cacao, coffee, citrus fruits, pine-apples, mangos, yams, rubber, etc.—are being conducted at Hope Experiment Station, and an account of the past year's progress is given in the report. In connexion with the sugar-cane experiments, it is mentioned that there is a constant and steady demand from planters for tops of B. 208, B. 147, D. 95, and D. 625 varieties.

Both Havana and Sumatra tobaccos are being grown experimentally, but the crops have suffered from drought during the past year. Sumatra tobacco, raised in the open, gave as good results as that grown under shade cloth. Seedlings of 'Arriba' cacao, have been obtained from Ecuador, and are being raised experimentally. The produce of this variety commands an exceptionally high price.

*Agricultural Educational Work.* An account is given of the work done with the various classes held at the Hope Experiment Station. The industrial school boys do practical work daily in the garden, and also receive instruction in theoretical principles. The course of training, including lectures, demonstrations, and practical work, is provided for garden apprentices. Instruction is also given to laboratory students and elementary school teachers. The Travelling Instructors appear to be doing excellent work among the small landholders, in showing them better methods of cultivation and the proper way to treat their crops, as well as by introducing new and improved varieties of plants. The Instructors, too, have been largely instrumental in the establishment of Agricultural Loan Banks, the institution of a Prize-holdings Scheme among small holders, and the adoption of co-operative methods in the purchase of expensive agricultural appliances.

*Island Chemist's Report.* This contains an account of the routine work done during the year. Samples to the number of 856 were analysed, as compared with 1,213 analyses during 1905-6. Seven students attended the course in Agricultural Science held during the year, and five were successful in passing the Diploma examination of the Board of Agriculture.

Reference is also made to the chemical work done in connexion with the sugar-cane experiments, and an account is given of the investigations of Jamaica rum that have been made.

**TRINIDAD: ANNUAL REPORT OF THE GOVERNMENT ANALYST, 1906-7.** By Professor P. Carmody.

This report gives an account of the analytical and educational work carried on at the Government Laboratory during the past year. The number of samples analysed shows a decrease of 466 as compared with 1905-6. These are classified as follows: revenue samples, 459; criminal cases, 128; sanitary, 205; agricultural and industrial, 218; miscellaneous, 221; unofficial, 78.

The samples denominated as 'sanitary' consisted in large measure of milk; butter, aerated waters, and tinned foods coming a long way below.

It is pointed out, however, that the number of milk samples analysed is much less than was the case last year, this being due to the fact that the addition of water to the milk supply of Port-of-Spain is now so rarely practised that it was found unnecessary to make as many purchases as before. The number of adulterated milk samples was 10.7 per cent., and although this is quite high enough, it is the lowest figure on record during Professor Carmody's seventeen years' experience. The decrease in the practice of adulteration is attributed to the fact that, in Trinidad, the licence of a milk seller is permanently taken away from him on being convicted for a third time of watering his milk.

The educational work carried on at the Government Laboratory consisted of courses of instruction in Agricultural Science and Theoretical and Practical Chemistry, given to students from the Royal and St. Mary's Colleges, and to pupil-teachers from the Training Schools. As many as 244 students attended these courses.



## CACAO IN TRINIDAD.

The *Maritime Merchant* of October 17 last, reporting an interview which a representative of that paper recently had with a Trinidad merchant, quotes the following references which were made to the cacao industry of the island:—

The high price of cacao is putting a lot of money into local circulation. The crop this year, though smaller than usual, will net the island about \$8,000,000. This is more than three times the value of the sugar crops, and it indicates how the cacao industry has grown in the last ten years. Within the next few years Trinidad will be exporting at least 6,000,000 lb. of cacao, and at an average price of, say, 20c. (it is more than that to-day), this will afford a revenue of \$1,200,000 annually from this one item alone.

The great advantage of the cacao industry is that it can be undertaken either on a small or large scale. It gives a chance to the man of little means as well as to the capitalists, so that while in Trinidad there are very large estates which represent a considerable amount of money, there are also cultivators with relatively small estates. The thing that Trinidad is most in need of to-day is more railways. The back country must be opened up so that more crops can be marketed quickly and economically. The question is now engaging the attention of the Government of the colony, and hopes are entertained that those outlying but fertile districts, which only need railway connexion, to make them immensely productive, will shortly have better means of transportation provided for them.

## CACAO DRYING HOUSE AT TRINIDAD.

In the *Quarterly Journal* of the Liverpool University Institute of Commercial Research in the Tropics, there is given an account (illustrated with a plan) of a patent drying house for cacao which was erected in Trinidad some time ago, at a cost of £300. This house, it is stated, is capable of drying 60 centals of cacao (1 cental = 100 lb.) in from forty-eight to sixty hours.

The drying house consists primarily of three rooms. Two of these are much larger than the third, and one is situated over the other. The cacao to be dried is spread on the floor of the upper large room, this floor being formed by boards, about 4 inches broad, very narrow slits being left at the junction of the boards, so as to admit the heated air from below. The air is heated in a smaller room, about 11 feet square, which is built up against the long side of the lower large room.

On one side of the smaller room is a stoke-hole, and leading away from it and running the length of the room, is a series of iron tubes. These tubes double backwards and forwards two or three times, and finally end in a chimney on the same side of the room as the stoke-hole. When the fires are lit, the flames are drawn through the tubes by the draught of the chimney, and the latter are brought to a white-heat in this way. A series of holes is made in the wall between the two downstairs rooms, and a similar series occurs on the opposite wall of the smaller room, leading into the open air. By this means a current of air is provided, which is raised to a high temperature in crossing the room over the heated tubes. This is led into the room beneath the drying chamber, finally escaping into the open by two apertures in the opposite wall, although, of course, a good deal rises into the drying chamber above by means of the slits between the boards.

The floor of the drying chamber is quite flat, and is surrounded by a strong, slanting edging about 16 inches high. Rails run along the side of the floor, and project beyond it, being supported on pillars: these carry the moveable roof on wheels. When strong sun prevails, the roof may be pushed back, and the cacao dried by sun heat, if preferred. The roof is made of flat, galvanised, iron plates, as with corrugated roofing there would be a tendency for the moisture arising from the cacao to gather and fall back in drops, causing the beans to mould. For the same reason, the roof is given a thick coating of tar on the inside. By means of windows in the roof, which can be opened when necessary, the room can be ventilated. This is done when the workman goes in to turn the cacao beans. If the rooms have been heated all day, the windows are opened in the evening to let out the air laden with moisture from the cacao. Later, they are closed to guard against dew and rains. These precautions prevent the beans becoming mouldy. It is stated that this drying house can be worked by two men only. The cacao beans should be spread out in a layer 6 inches deep.

On the plantation owning this drying house, the fermenting house was also built in a very convenient way. It stood on a rise close to, and at the height of, the drying floor. It had no walls, but a projecting roof, and, by means of rails extending across, the boxes of beans could be brought over at the close of fermentation, and emptied on the drying floor.

## CACAO IN SAMOA.

Cacao cultivation is a growing industry in the island of Samoa, the exported produce coming second in value in the list of exports, although it is a good way below copra. Great hopes are entertained, however, as to the development of the cultivation in the future. Particulars of present conditions are given in the latest *Annual Report* on Samoa of the British Consul, from which the details given below have been abstracted.—

All the planters are sanguine as regards the success of the present year's cacao crop. Some of the smaller growers, with farms of from 20 to 40 acres each, are making a living out of the cultivation.

If the trees are manured, full crops, it is stated, can be obtained when the plants are only five years old; but otherwise, maturity is delayed beyond this period.

As compared with the produce of other countries, the cacao grown in Samoa appears to be good. The plantations are of all sizes, from 5 to 500 acres or more. The trees are usually planted about 15 feet apart, sometimes 18 or 20 feet.

There are two kinds of cacao grown, the Criollo and the Forastera, the latter, it is remarked, being a true Trinidad cacao.

Quoting a cacao authority who recently visited Samoa, the writer of the report refers to the practice of growing mixed plantations of cocoa-nut palms and cacao trees of the Criollo variety, as one likely to end in failure. On the other hand, Forastera is described as a variety that will give good results when grown in this way, the distance from row to row that is recommended being about 16 feet.

It is pointed out that the Criollo variety of cacao is delicate, requires good soil, a protected position, and careful treatment. On a soil on which another crop is already growing, Criollo will not flourish, but Forastera will. Where the necessary favourable conditions are present, it is recommended that the Criollo variety should be grown in preference to the Forastera.



## WEST INDIAN PRODUCTS.

### Drugs and Spices on the London Market.

The following report on the London drug and spice market for the month of September has been received from Mr. J. R. Jackson, A.L.S.:—

The holiday season, having been considerably lengthened by continual fine weather during September, after a cold and dreary summer, has had the effect of causing the drug, spice, and chemical markets to continue very slow and inactive, particularly during the first three weeks of the month. An improvement is generally looked for towards the close of September, but the last week of the month was, perhaps, not up to the usual average; in fact, nothing of special interest marked the trade of the whole period. West Indian products had no special attractions, as will be seen from the following details:

#### GINGER.

At the spice sale on the 4th of the month no business was done. Jamaica was not represented, and 250 bags of Calicut offered, were all bought in. A week later no Jamaica again appeared, and 18 bags of small bright washed Cochin were bought in at 36s. Some small sales of Japan were effected privately at 27s. 6d. On the 18th, the whole of the offerings consisted of Cochin and Calicut, all of which were bought in; and at the last sale on the 25th, at which again, no Jamaica appeared, some 219 bags of Cochin were offered, 100 of which found buyers at 34s. to 34s. 6d., including ordinary wormy washed rough. A fair quantity of Calicut was also offered and bought in, unsorted native cut at 60s., and bold cut at 95s.

#### NUTMEGS, MACE, AND PIMENTO.

For nutmegs at the first auctions on the 4th, steady prices were obtained. A week later, namely on the 11th, as many as 1,006 packages of West Indian, being a record quantity, were offered, and all were practically disposed of, steady prices being obtained for the larger sizes. Nothing further of interest took place in nutmegs after the above date. Of mace, a large quantity of West Indian was offered and sold at the spice auction on the 11th of the month, at steady rates, and on the 25th a quantity of fair red Penang was offered and bought in at 1s. 9d., and dull at 1s. 5d. At the first spice sale on the 4th, 60 bags of Pimento were offered and sold at 3½d. for middling. At this price there was little or no change, till at the end of the month the quotation stood at 3½d. per lb. English oil of pimento was quoted at 8s. 3d. per lb.

#### ARROWROOT.

Four and a half barrels of St. Vincent were offered at the first spice auction on the 4th of the month, good fetching 4d. per lb. A week later the offerings were unimportant, 3 barrels only of St. Vincent being sold without reserve at 2½d. per lb. At the sale on the 18th no arrowroot was offered, but a good business was reported to have been done privately, about 3,000 barrels of manufacturing St. Vincent being disposed of privately at 2½d. to 2¾d. per lb.

#### SARSAPARILLA.

The month commenced with the announcement that 12 bales of native Jamaica and 30 bales of Vera Cruz had arrived, and the prices ruling the market remained the same as in the month preceding. A week later, genuine grey Jamaica was reported scarce, 9 bales only being offered, which realized for fair, 1s. 8d. per lb., and for sea-damaged, 1s. 6d. Native Jamaica was offered to the extent of 13 bales, which

were practically all sold at firm prices, dull red and yellowish mixed realizing 1s. to 1s. 1d. per lb. At the last drug sale on the 26th, a firm tone prevailed generally; 6 bales of genuine grey Jamaica out of 14 offered, realized 1s. 8d. per lb. A bale of dull red native Jamaica fetched 1s. 1d., and dull grey sea-damaged, 10d. per lb. For fair red, 1s. 1d. was offered, but was refused, 1s. 2d. being the price asked. Two bales of fair Lima-Jamaica were sold at 1s. 5d. to 1s. 6d. per lb.

#### CASSIA FISTULA, KOLA, TAMARINDS, ETC.

At the commencement of the month 20s. per cwt. was the price quoted for West Indian Cassia Fistula. On the 11th, 7 barrels of dark Jamaica kolas fetched 3d.; and 2 bags dark and mouldy Jamaica 2d. per lb. At the same sale fair Ceylon kolas were held at 3½d. On the 25th, 5 bags fair dried Jamaica were offered but held at 3d. per lb., at which price they were afterwards disposed of privately. For a barrel of green mouldy ½d. per lb. was paid. At the beginning of the month, new Barbados tamarinds were offered at 20s. in bond, and fair Antigua at 16s. At the same date distilled oil of limes was reported very scarce, 3s. 3d. to 3s. 6d. per lb. being the quotations. A week later 2 cases of fair West Indian distilled sold at 3s. 2d. per lb., and at the end of the month a case of distilled Dominica sold at 2s. 9d. per lb.

### SEED SELECTION IN RUBBER CULTIVATION.

An article appeared in a recent number of the *Journal d'Agriculture Tropicale*, by M. Vernet, Chemist to the Pasteur Institute at Nha-Trang, Annam, in which the writer discussed the steps that should be taken to promote the cultivation of *Hevea brasiliensis* throughout French Indo-China. M. Vernet is associated with a large rubber estate in the neighbourhood, and at present this district marks the most northerly limit of *Hevea* cultivation. The estate in question possesses a number of seven and nine-year old *Hevea* trees, the average yield from the former being 1.32 lb. of dry rubber, and from the latter, 2.2 lb. of dry rubber.

M. Vernet is a strong advocate of seed selection, and he believes that it is by this means that the development and extension of *Hevea* rubber cultivation will be best promoted in Indo-China. He advises that seeds intended for planting should not be gathered from trees which are too young, neither should trees which bloom and fruit early in the season be depended on for seed supplies. The trees in the plantation, he suggests, should be divided into four classes:—

- (1) Those which give very high yields of latex: The seeds from these trees should be given every attention and planted in the best land on the estate, while the young plants should be carefully tended with a view to future selections.
- (2) Trees with a yield above the average: The seeds from this lot can be used to plant up the remainder of the estate.
- (3) Trees yielding a quantity of latex below the average: Seeds from these trees should not be used.
- (4) Trees with a very low yield: In this case it will be best to destroy the trees, and replant.

When gathering, only those seeds which are perfectly ripe should be picked; the others can be left for future plucking.



## MARKET REPORTS.

London,—October 29, 1907, 'THE WEST INDIA COMMITTEE CIRCULAR,' Messrs. KEARTON, PIPER & Co.; October 18, Messrs. E. A. DE PASS & Co.; 'THE LIVERPOOL COTTON ASSOCIATION WEEKLY CIRCULAR,' October 25, 1907.

ARROWROOT—St. Vincent, 2 $\frac{3}{4}$ d. to 2 $\frac{1}{2}$ d. per lb.  
BALATA—Sheet, 2/3 to 2/7; block, 1/10 to 1/10 $\frac{1}{2}$  per lb.  
BEES'-WAX—£7 to £7 5s. per cwt.  
CACAO—Trinidad, 112/- to 120/- per cwt.; Grenada, 112/- to 120/6; Dominica, 110/- to 113/-; Jamaica, 117/-; St. Lucia, 114/- to 118/- per cwt.  
COFFEE—Jamaica, 55/6 to 72/6; Santos, 29/4 $\frac{1}{2}$  to 29/9 per cwt.  
COPRA—West Indian, £22 per ton.  
COTTON—18d. to 22 $\frac{1}{4}$ d. per lb.  
FRUIT—  
BANANAS—Jamaica, 4/6 to 5/- per bunch.  
PINE-APPLES—St. Michael, 2/3 to 4/6 each.  
GRAPE FRUIT—13/- to 17/- per box.  
ORANGES—Jamaica, 7/- to 9/6 per box.  
FUSTIC—£4 5s. to £4 15s. per ton.  
HONEY—18s. 6d. to 25s. 6d. per cwt. according to quality.  
ISINGLASS—West India lump, 1/10 to 2/- per lb.; cake, 1/3.  
LIME JUICE—Raw, 1/1 to 1/5 per gallon; concentrated, £21 per cask of 108 gallons; Distilled Oil, 1/11 to 2/- per lb.; hand-pressed, 4/3 to 4/6 per lb.  
LOGWOOD—£4 4s. to £4 15s. per ton; Roots, £3 5s. to £4 5s. per ton.  
MACE—Fair, 1/- to 1/3; pale, 1/4; broken, 10d. to 1s.; ordinary 1s. to 1s. 1d. per lb.  
NUTMEGS—75's, 8d.; 77's, 6d.; 92's to 103's, 5 $\frac{1}{2}$ d. to 6 $\frac{1}{2}$ d.; 112's to 134's, 4 $\frac{1}{2}$ d.  
PIMENTO—Fair, 3 $\frac{1}{10}$ d. to 3 $\frac{1}{8}$ d. per lb.  
RUBBER—Fine hard Para, 4s. 3 $\frac{1}{4}$ d. to 4s. 4 $\frac{1}{2}$ d.; fine soft, 4s. 3 $\frac{1}{4}$ d. to 4s. 3 $\frac{1}{2}$ d. per lb.  
RUM—Jamaica, common, 2s. 7d.; good, 2s. 10d.; fine, 3s. to 8s.; Demerara, 1s. 1d. to 1s. 2 $\frac{1}{2}$ d. per proof gallon.  
SUGAR—Crystals, 17/6; Muscovado, 9/4 $\frac{1}{2}$ ; Molasses, 11/3 to 11/6.

New York,—October 18, 1907.—Messrs. GILLESPIE BROS. & Co.

CACAO—Caracas, 25 $\frac{1}{2}$ c. to 29c.; Grenada, 25c. to 26c.; Trinidad, 25c. to 26c.; Jamaica, 24c. to 25c. per lb.  
COCOA-NUTS—Jamaica, select, \$32.00 to \$34.00; culls, \$20.00 to \$22.00; Trinidad, \$30.00 to \$32.00; culls, \$18.00 to \$20.00 per M.  
COFFEE—Jamaica, ordinary, 7 $\frac{1}{4}$ c. to 7 $\frac{7}{8}$ c.; good ordinary, 7 $\frac{1}{4}$ c. to 7 $\frac{7}{8}$ c.; good washed, 11c. to 11 $\frac{1}{2}$ c. per lb.  
GINGER—Small to bold dark 13 $\frac{1}{2}$ c. to 14 $\frac{3}{4}$ c.; small to bright bold, 15c. to 15 $\frac{3}{4}$ c. per lb.  
GOAT SKINS—Jamaica, 50c.; St. Kitt's, Antigua, and St. Thomas, 43c. to 48c.  
GRAPE FRUIT—Jamaicas, \$4.50 to \$7.00 per barrel.  
LIMES—\$3.00 to \$4.50 per barrel.  
MACE—29c. to 33c. per lb.  
NUTMEGS—110's, 10 $\frac{1}{2}$ c. to 11 $\frac{1}{2}$ c. per lb.  
ORANGES—Jamaica, \$5.00 to \$5.50 per barrel.  
PIMENTO—6 $\frac{1}{2}$ c. per lb.  
SUGAR—Centrifugals, 96°, 3.90c.; Muscovados, 89°, 3.40c.; Molasses, 89°, 3.05c. per lb., duty paid.

## INTER-COLONIAL MARKETS.

Barbados,—Messrs. JAMES A. LYNCH & Co., November 12, 1907; Messrs. T. S. GARRAWAY & Co., November 11, 1907.

ARROWROOT—St. Vincent, \$4.25 to \$4.50 per 100 lb.  
CACAO—Dominica, \$22.00 to \$24.00 per 100 lb.  
COCOA-NUTS—\$22.80 per M. for husked nuts.  
COFFEE—Jamaica, \$8.25 to \$10.50 per 100 lb.  
HAY—\$1.60 to \$1.80 per 100 lb.  
MANURES—Nitrate of soda, \$62.00 to \$65.00; Ohlendorff's dissolved guano, \$55.00; Cotton manure, \$42.00; Cacao manure, \$42.00 to \$48.00; Sulphate of ammonia, \$72.00 to \$75.00; Sulphate of potash, \$67.00 per ton.  
ONIONS—Madeira, \$3.00 per 100 lb.  
POTATOS, ENGLISH—\$4.00 per 160 lb.  
PEAS—Split, \$6.00; Canada, \$3.10 to \$3.60 per bag.  
RICE—Demerara, \$5.50 to \$5.75 (177 to 180 lb.); Patna, \$3.65 to \$4.00; Rangoon, \$2.86 to \$3.10 per 100 lb.  
SUGAR—no quotations.

British Guiana,—October 19, 1907.—Messrs. WIETING & RICHTER.

ARROWROOT—St. Vincent, \$10.00 to \$10.50 per barrel.  
BALATA—Venezuela block, 32c.; Demerara sheet, 48c. per lb.  
CACAO—Native, 16c. to 17c. per lb.  
CASSAVA—No stock.  
CASSAVA STARCH—\$9.00 per barrel.  
COCOA-NUTS—\$12.00 to \$16.00 per M.  
COFFEE—Creole, 13c. to 14c.; Jamaica, 12c. per lb.  
DHAI—\$4.60 to \$4.90 per bag of 168 lb.  
EDDOS—\$1.20 to \$1.68 per barrel.  
MOLASSES—18c. to 19c. per gallon.  
ONIONS—Madeira, 1 $\frac{1}{2}$ c. to 2 $\frac{1}{2}$ c.; Lisbon 2c. per lb.  
PLANTAINS—20c. to 48c. per bunch.  
POTATOS,—Madeira,  $\frac{3}{4}$ c. to 1c. per lb.  
POTATOS, SWEET—Barbados, \$1.56 per bag.  
RICE—Creole, \$4.75 to \$5.00 per bag; Seeta, \$6.00 per bag.  
SPLIT PEAS—\$6.50 to \$6.75 per bag (210 lb.).  
TANNIAS—\$2.52 per bag.  
YAMS—White, \$3.00; Buck, \$3.00 per bag.  
SUGAR—Dark crystals, \$2.17 $\frac{1}{2}$  to \$2.55; Yellow, \$2.90 to \$3.10; White, \$3.60 to \$4.00; Molasses, \$1.80 to \$1.90 per 100 lb. (retail).  
TIMBER—Greenheart, 32c. to 55c. per cubic foot.  
WALLABA SHINGLES—\$3.50 to \$5.50 per M.

Trinidad,—November 2, 1907.—Messrs. GORDON, GRANT & Co.

CACAO—\$25 to \$25.50 per fanega; Venezuelan, \$25.25 to \$25.75 per fanega.  
COCOA-NUTS—\$23.00 per M., f.o.b.  
COCOA-NUT OIL—85c. per Imperial gallon.  
COFFEE—Venezuelan, 7c. to 7 $\frac{1}{2}$ c. per lb.  
COPRA—\$3.45 to \$3.60 per 100 lb.  
DHAI—\$4.40 to \$4.50 per 2-bushel bag.  
ONIONS—\$2.25 to \$2.50 per 100 lb. (retail).  
POTATOS, ENGLISH—\$2.00 to \$2.25 per 100 lb.  
RICE—Yellow, \$5.60 to \$5.65; White, \$5.50 to \$6.55 per bag.  
SPLIT PEAS—\$6.00 to \$6.25 per bag.  
SUGAR—Grocery grades, \$1.60 to \$3.25 per 100 lb., according to quality.





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Agriculture in the Leeward  
Islands, in 1907.

**D**URING a recent visit to the Leeward Islands, an officer on the Staff of the Imperial Department of Agriculture made observations on the agricultural conditions prevailing

there which may prove of general interest.

In Antigua, it was found that although a drought had been experienced earlier in the year, good rains had since fallen; during September, in fact, a slightly heavier rainfall than was really needed had been experienced in some parts of the island.

On account of the critical condition of the labour situation earlier in the year, the cane crops on some estates had been reaped late in the season. The ratoons from these fields were seen to be very backward, and it seemed doubtful, if, even with the most favourable conditions, they could produce a fair crop in the next reaping season. Fields of plant canes, and ratoons following early reaped canes, were very promising.

Cotton in Antigua was variable, though on the whole the prospects were decidedly encouraging. A few fields of very early planted cotton were attacked by leaf-blister mite, and in one instance a field of early cotton was shedding its bolls. The attacks of cotton worm were much less severe than in 1906. In one section of Antigua a slight attack of cotton-boll worm was being experienced. The cotton-boll worm is also a corn ear worm, i.e., the true boll worm feeds on corn, and at times burrows into the ear. Crops of corn had been badly attacked by worms in 1906, and it is in consequence of that attack that the boll worms are prevalent on cotton this year in that part of Antigua. In the last number of the *Agricultural News* an article appeared which dealt with the cotton-boll worm in the West Indies. These worms are quite distinct from the Mexican boll weevil and should not be confused with it. The boll weevil has not yet made its appearance in the British West Indies.



The general adoption of implements on estates in Antigua will be a step in keeping with modern agricultural practices the world over. Not only will it render the planter and estate owner better able to carry on the work of the estate in times when there is a scarcity of labour, but it should result in improved crops, at a smaller cost of production, and it should also improve the labourer himself. The labourer who becomes capable of doing good work with the plough, harrow, cultivator, weeder, etc., must be regarded as somewhat skilled, especially when compared with men who can work with hoe or fork only.

In the editorial of a recent number of the *Agricultural News* (see Vol. VI, p. 339), the development of mechanical tillage is dealt with in some detail. In certain districts of Antigua attempts have been made to grow crops for green manure on a large scale, but the ravages of certain insect pests have made this a difficult matter, because the insecticides used to combat the attacks had an injurious effect on the plants.

In St. Kitt's, the drought of the early part of the year was continued until the end of September, and it was only on especially favoured estates that the canes gave promise of anything like a fair crop, although planters in that island mentioned that with good rains in October and November, St. Kitt's should still make a good return.

Cotton had withstood the drought much better than the cane, and in most places was very fine in appearance. On certain estates it was observed that a few cotton plants in the fields showed a peculiar reddish appearance of the leaves, quite different from the ordinary reddish appearance due to the old age of the leaf, or to mildew. Young plants died when seriously attacked, but older ones merely dropped all their leaves and put out fresh shoots. Curiously enough, this disease or infection did not seem to spread. In many instances, of two plants standing side by side, one was attacked while the other escaped. As this condition occurred on only a few estates and affected only a few plants in a field, it cannot, so far, be regarded as a serious pest of cotton. This is the first occasion that this disease has been noticed in St. Kitt's.

The leaf-blister mite was being well kept in hand by the picking off of the infested leaves, and the use of sulphur and lime.

The cotton aphid has proved troublesome on limited areas in St. Kitt's, as in nearly every one of the islands, and in some instances has been successfully

and economically controlled by spraying with kerosene emulsion. Several fields of young cotton, which were badly attacked, have been pulled up and replanted.

In Nevis, cotton has come to be a crop of first importance. On two of the largest estates, sugar-cane cultivation is being given up. On one of these, cotton and cacao are being grown, and on the other, cotton, cocoa-nuts, and limes. The cacao is growing in the ravines in the mountains and is coming into bearing. The cocoa-nuts and limes are young plantations just being established. Broom corn has been grown experimentally in Nevis for a few years past. During the present season this crop is being grown on a fairly large scale under estate conditions. Cotton gave promise of better crops than were reaped last season. The cotton grown by the peasants and small cultivators showed a great improvement over last year. Leaf-blister mite and the cotton worm were better understood, and the remedies were promptly applied.

In Montserrat the weather had, on the whole, been favourable. The rainfall had not been great, but had been distributed in such a way as to be of the utmost value, a fair amount having been experienced during nearly every month since early in the year. The cotton in Montserrat was most remarkable in its generally healthful appearance, in its uniform height, and in its freedom from insect and other pests. On a few fields there were small areas affected by the same trouble which has already been mentioned as occurring in St. Kitt's. A few plants had died, but by far the larger proportion had put out new leaves and branches and had made complete recovery.

Leaf-blister mite had not appeared to any considerable extent, and the cotton worm had been much less troublesome than in previous years. London purple is used to a large extent and apparently with good results in combating the cotton worm. In Montserrat, the practice is to use 1 lb. of Paris green to 8 lb. of lime. London purple is mixed at the rate of 1 lb. to 5 lb. of lime. It will be seen from this that the mixtures are made in exact proportion to the relative amounts of arsenic in the two substances. Every 9 lb. of Paris green mixture contains 1 lb. of Paris green, whereas every 9 lb. of London purple mixture contains  $1\frac{1}{2}$  lb. of London purple. There is approximately the same amount of arsenic in 1 lb. of Paris green that there is in  $1\frac{1}{2}$  lb. of London purple.

It will be seen from what has been stated that the agricultural prospects in the Leeward Islands on the whole are encouraging and that there is promise of a satisfactory crop of cotton.



## SUGAR INDUSTRY.

### Cane Crop Prospects in Demerara.

Cane cutting and sugar making were reported to be in progress on most estates in Demerara early in October.

Apart, however, from one day of rain, which occurred late in September, very hot and dry weather had been experienced for some time previous, with the result that the cane crop showed signs of suffering for want of moisture. Young canes are described as having a healthy appearance, and advanced canes are rapidly ripening, although the latter are short for their age.

While on the open porous soils, it is reported that the stand of canes is fairly good, on the heavy clay soils the crop is miserable, this condition being attributed to the heavy rain and cold weather experienced during the early part of the year. At no time since then has growth been vigorous or satisfactory.

The cane juice of the crop so far reaped is said to be of satisfactory quality, and to contain 1.5 to 1.6 lb. of cane sugar per gallon, the quotient of purity (or percentage of cane sugar in the total solids of the cane juice) being from 85 to 88. The canes, however, are described as lacking in juice.

It is reported, too, that it is practically certain that the crop yield will be about 15 per cent. below the usual average. Some heavy-soil estates will show a shortage of 20 per cent., but in a few favoured localities where the soil is rich and porous, the shortage will probably be unimportant.

### Sugar Production in Southern China.

In the British *Consular Report* on the trade of Swatow for 1906, an account is given of the trade in sugar (which is the staple export product of the district) that is carried on at the port, and of the methods adopted in the cultivation of the sugar-cane in the neighbouring country districts. From this account the particulars given below have been abstracted:—

The sugar exports from Swatow during 1906 reached 556,845 piculs (1 picul = 133 lb.). This was a considerable drop compared with the shipments of the previous year. Formerly Swatow sugar supplied all the ports of northern China, but lately refined sugar imports from Hong-Kong, Japan, and Java have tended to displace the home-grown product.

The sugar industry at present is in a depressed condition but efforts are afoot to bring about a better state of affairs and to restore its former prosperity.

The area under sugar cultivation in the neighbourhood of the port of Swatow is about 22,500 acres, the native sugar-crushing mills numbering about 2,000. These work, on the average, about 100 days in the year, each turning out from 700 to 1,200 cwt. of sugar. Each mill employs about twenty-five hands, the hours of work being from 5 a.m. to 9 p.m. In some districts canes appear to be grown on the farmer system, mill owners buying canes from small cultivators; but in other districts there is a mill in each village, which is hired out in turn to the growers at so much per day. An acre of land will produce about 2 tons 14 cwt. of sugar, about fifty-five bunches of stalks being required to produce 125 lb. of juice. White sugar now fetches from \$6 to \$8 per cwt., according to quality. Two years ago the produce in sugar-cane of an acre of land was worth \$270, while last year, owing to the

fall in sugar prices which took place all over the East, the value of an acre of produce was no more than \$150.

In growing sugar, the land is planted early in the year, the cane taking about ten months to mature. The canes are planted, in bunches of five or six, in rows, and about 1 foot from bunch to bunch. From 7,000 to 8,000 bunches are required for an acre of land. A mistake which is frequently made, however, is to plant too closely, so that the individual plants of the crop do not get the full advantage of the sun's rays. In the first year, as indicated, the crop is grown from cuttings, which are well watered for a few days after being set out. A kind of ratooning is practised during the second and third years, the crop being raised from the old roots, which are allowed to remain, banked up with mud after the cane has been cut. In the fourth year the roots are stubbed up, and the land is planted with some other crop.

### Conditions in Cuba.

The prospects attendant upon the present season's sugar-cane crop in Cuba do not appear to be very promising. Owing to the excessive drought which has been experienced during the past year, canes have grown very slightly, the harvest will be late and the crop is reported as being very short. One large sugar grower, writing in the *Havana Post*, estimates that the yield will fall below last year's crop by no less than 350,000 tons. The total sugar production of Cuba in 1905-6 was 1,179,000 tons.

It is stated, too, by the Cuban correspondent of the *Louisiana Planter*, that many factories will not be able to open during the coming season. Various reasons are assigned for this—lack of cane and of financial resources being the most important. There is too, just now, a great scarcity of labour in the island.

Up to the present, Cuba has been almost entirely dependent upon Spanish immigration, but the Government of Spain is now putting difficulties in the way of further emigration on the part of the labouring classes of that country.

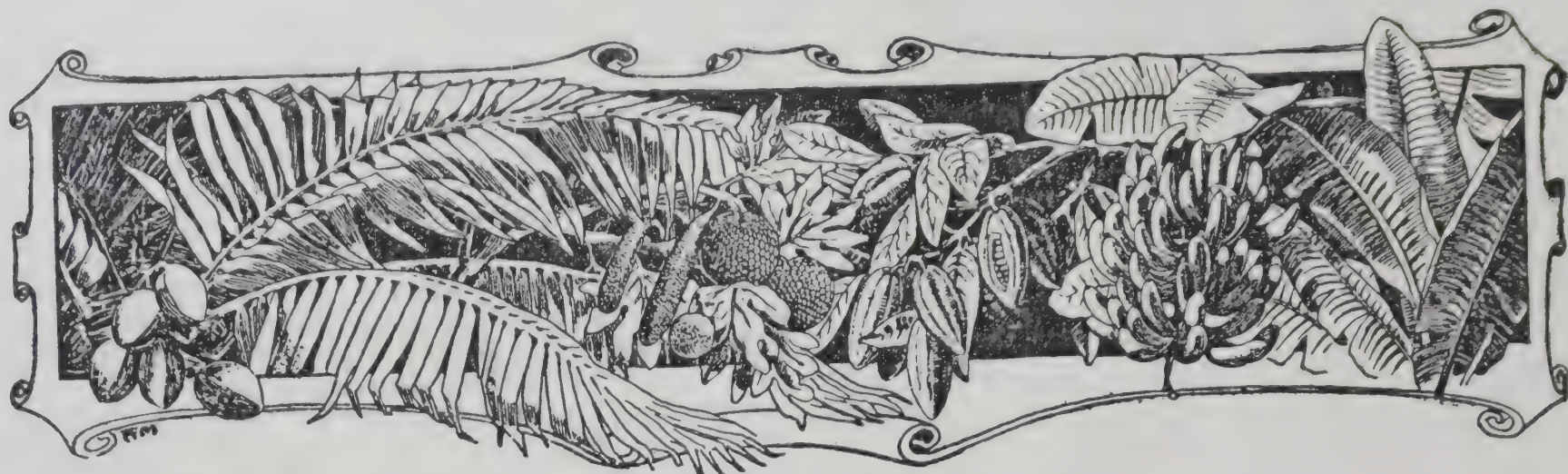
The provision of advantages sufficient to attract a good supply of immigrant labour is now the chief problem before the planters of Cuba, and since there has of late been an enormous emigration of Italian labourers to the United States, several of the Cuban newspapers are said to be urging the Government to make efforts to obtain the required labour from Italy.

### The Indian Sugar Crop.

The following note on the present season's sugar crop in India appeared in the *Louisiana Planter* of October 5 last:—

The Government reports from Bengal, Bombay, and the united provinces of Agra and Oudh, up to the middle of August, indicate a comparatively satisfactory condition of the sugar-cane crop in India. While Indian sugars do not appear in the markets of the world, being all consumed at home, the industry is of great interest to the rest of the cane sugar world, owing to its vastness in India. The present reports cover about 70 per cent. of the total area in sugar cane in India, the approximate area of this 70 per cent. being about 2,000,000 acres, which would indicate a total area of sugar-cane in cultivation in India of some three millions of acres. The output is expected to be up to the average





## WEST INDIAN FRUIT.

### THE MANGOSTEEN.

On the occasion of the visit of the Imperial Commissioner of Agriculture to Dominica in the early part of November, his attention was drawn to a fine healthy Mangosteen plant growing at St. Arment estate. This was loaded with fruit, and it was estimated that from 350 to 400 fruits would mature this season. Mangosteen fruits are also successfully produced at Trinidad and Jamaica. In other localities plants of this noted East Indian fruit tree are in thriving condition, but have not yet reached the fruiting stage.

### BRITISH WEST INDIAN FRUIT COMPANY.

Reviewing the report of the British West Indian Fruit Company for the year ending June 30, 1907, the *Port-of-Spain Gazette* of November 14 says:—

This report shows a loss of £817 14s. 8d. on the trade done during the past year. The business done, though still unremunerative, has resulted in a smaller adverse balance than in the preceding year. The main obstacle hitherto encountered by the company has been the difficulty of obtaining a sufficient quantity of bananas in Trinidad suitable in quality for the English market, the planting of bananas on old sugar land having given, in some cases, unsatisfactory results.

Although the company has endeavoured to stimulate cultivation by offering favourable prices, the fruit purchased has been mostly small in size, and therefore not well suited to compete with bananas imported from other countries. Until bananas of good size and quality are obtainable at the prices ruling at other sources of supply, and in sufficient quantity to fill the space in the Mail steamers put at the disposal of this company by the Royal Mail Steam Packet Company, satisfactory trading results cannot be expected. The arrangement with the Trinidad Government, by which the company paid a small subsidy, amounting to £279 in the year under review, and which in any year was subject to a maximum of £508, has been terminated, as it was found the advantages were not such as to compensate for the restrictions which the contract imposed on the company. Efforts have been made to secure a market for Trinidad limes and oranges. The shipment of limes resulted unsatisfactorily, but the prospect of trade in oranges is more hopeful. The export of bananas from Barbados, established under the auspices of Sir Daniel Morris, Imperial Commissioner of

Agriculture in the West Indies, has suffered from drought during the past few months, but it is not anticipated that planting will be discontinued or restricted in consequence.

### BANANAS VERSUS PLUMS IN ENGLAND.

The abundant crops of plums which have been experienced in England during the past season have, it is stated, been the cause of a discussion, carried on in many newspapers, as to the relative food value of this native fruit compared with the imported banana. This discussion has chiefly centred round the Victoria plum and the Canary banana.

A well known West of England paper has taken a prominent part in debating the question, and has advanced in its columns a mass of figures and arguments in support of the assertion that English plums are 50 per cent. cheaper, on the basis of their nutritive properties, than Canary bananas, and also far better adapted for English consumption from a health point of view, than the imported fruit. Plum growers, it is urged, should adopt the methods which have been utilized with so much advantage by banana producers and dealers, and by the judicious dissemination of literature impress upon consumers the nutritive value of the home-grown fruit. By this means, it is hoped, English plums will largely displace bananas on the home market.

Without for a moment wishing to disparage the qualities of the delicious English plums, it is obvious that there is no comparison between this fruit and the banana as regards food value. The latter contains nearly ten times the amount of albuminous constituents possessed by the plum; it also contains more than ten times the amount of sugar, and rather more mineral matter. The nourishing properties of the banana have been long recognized in England, and the fruit has come to stay. Further, the uncertain nature of the English plum crop, and the fact that this fruit is available in its fresh condition for only a short period of the year, give it no chance of displacing the banana, which can be obtained in fresh supply from January to December.

**Bananas in Brazil.** Although nearly the whole of Brazil is within banana-growing latitudes, this fruit is cultivated only in the State of Santa Catharina. Banana trees, however, grow wild over many portions of northern and central Brazil, and a considerable quantity of fruit is exported. (*U. S. Consular Reports*)



## COFFEE EXPERIMENT IN JAMAICA.

The experimental work with coffee that is being carried on at the Hope Experiment Station, Jamaica, is thus described in the latest *Annual Report* of the Director of Public Gardens and Plantations:—

The experimental plantation of coffee has been regularly cleaned, mulched, and irrigated when necessary. The bushes were pruned in due season, and the crop was gathered and weighed. The coffee is grown chiefly as a means of training apprentices, etc., but various experiments are carried out at the same time; for instance, some coffee trees are planted under the shade of a leguminous tree, the guango (*Pithecolobium Saman*); others under the shade of the bread-nut (*Brosimum Alicastrum*); and others again alternately with the Anchovy pear (*Grias cauliflora*), which does not give any shade. Some of the coffee trees are pruned low, ('short-top' coffee), and some are allowed to run up ('long top' coffee). The crop from each tree has been carefully weighed during the last five years; the average weight in cherry per tree per annum is: under guango, for short-top, 21 lb. 10 oz., for long-top, 17 lb. 14½ oz.; under bread-nut, for short-top, 7 lb. 0½ oz., for long-top, 3 lb. 13½ oz.; under Anchovy pear, for short-top, 15 lb. 6½ oz., for long-top, 12 lb. 14½ oz.

It thus appears that shade increases yield at the elevation of Hope Gardens, that the better shade afforded by a leguminous tree, gives the best results, and that coffee pruned low, pays better than allowing the trees to run up.

## VARIETIES OF CACAO.

In a late number of *Planting Opinion* a brief article appears containing some interesting particulars as to the different varieties of cacao grown in the West Indies—more especially in Jamaica. To quote from the article in question:—

There are three chief varieties of cacao grown in the West Indies, viz., Forastero, Criollo and Calabacillo [or Calabash].

The typical Forastero cacao pod has a thick skin, deeply furrowed; the beans are somewhat rounded, slightly bitter and pinkish within.

The Criollo pod is thin-skinned and has a 'bottle-neck' near the stalk; the beans are rounded, sweet, and white inside.

The Calabacillo pod is usually small and round, with a smooth skin; the beans are flat, bitter, and of a dark-purple colour inside. The Criollo cured cacao commands the highest price of these three varieties, but the tree is the most delicate of all, and liable to disease. It can only be grown on the very best soils.

The Calabacillo requires twice the time and attention to ferment it as is needed by the Criollo, and fetches only a very low price. The tree is, however, very hardy, and will thrive on poor soil where other kinds would not grow.

The Forastero variety of cacao is intermediate in character between the Criollo and the Calabacillo. The quality of the cured cacao is good, but not as fine as Criollo. The tree, however, is not subject to disease, and bears large crops. This variety has been recommended for planting in Jamaica by the Department of Agriculture of that island.

[In this connexion it may be mentioned that on account of the superior value of the Criollo product, it has been suggested that this variety should be budded on to the stronger Forastero and Calabacillo trees already growing. The necessary budding material would be supplied by a few Criollo trees grown in favourable situations on each estate. Experi-

ments in this direction have been carried out with success in Jamaica. Ed. *A.N.*]

It is a matter of importance to planters to have as nearly as possible only one variety of cacao on an estate. Otherwise, e.g., if an estate has some trees of the Forastero variety, and others of the Calabacillo kind, the beans must be cured separately, or the fermentation will be too long for some, and too short for others, resulting in a badly cured sample.

In planting an estate for the first time, it is always advisable that one variety of cacao only should be grown. Many estates get a low price for the cacao simply because the trees are not even in character. The colour of the pod is a matter of little importance.

As regards situation for growing cacao, it should not be planted on dry ridges, but in moist sheltered valleys, and this is more essential in districts where the rainfall is small and uncertain.

## WEST INDIAN BROOM CORN.

Reporting on a trial shipment of broom corn sent from Antigua, Messrs. T. S. Simms & Co., Ltd., St. John, New Brunswick, write as follows to the Hon. Francis Watts, C. M. G.:—

The shipment of broom corn has come to hand. We find that it compares favourably with the corn we are getting from Oklahoma, although it is not quite equal to that raised in Illinois. If anything, the fibre is a little finer and the colour is better, than that of the Oklahoma corn.

The particular objection we have, however, is in regard to the length. The bales sent contained straw a good deal too long for use in our largest brooms, which necessitates cutting, and wasting the heavier part. We are having the same trouble with Oklahoma corn, and we think perhaps that if it were sown a little more thickly, this would prevent the straw growing to such length. On the whole we can use this corn to good advantage, but it would be more profitable, both to the grower and to ourselves, to have it shorter.

We usually buy in bales of 250 to 300 lb. each, bound with wire bands. If you made a business of raising the corn, the bales shipped should be more tightly pressed together in order to save space, and so reduce freight.

We are allowing the same price for this small shipment as Oklahoma corn, delivered here, costs us.

If this corn can be raised with you as cheaply as in the Western States, we think it should be a profitable crop, and you would have some advantage by way of freight, as much of the broom corn we buy comes entirely by rail from Oklahoma.

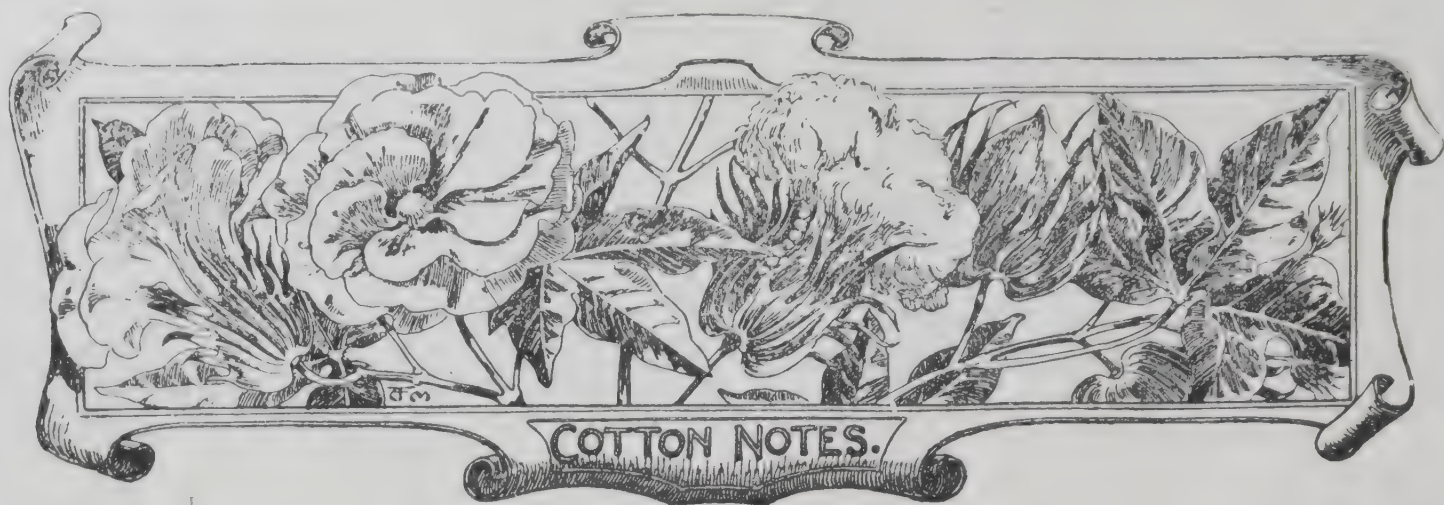
We are using about 300 tons of broom corn every year, and should you wish us to do so, we could probably dispose of a much larger quantity if you can raise it so as to compete with the United States product.

We shall be glad to hear from you again as to the prospects of your continuing to raise this crop, and what quality you would be likely to have.

In this connexion, too, Mr. W. Robson, Curator of the Botanic Station, Montserrat, reports that a small shipment of broom corn (250 lb.) was, in May last, sent to Canada from Montserrat by the Hon. W. H. Wilkin. This was disposed of by Mr. M. J. Russell Murray, and realized a price of 4½c. per lb., or \$11.25 for the bale.

From experiments that have been carried on at the Botanic Gardens, Mr. Robson is led to believe that a return of 600 lb. of brush per acre is about the yield that may be expected with the broom corn crop.





### WEST INDIAN COTTON.

Messrs. Wolstenholme and Holland, of Liverpool, write as follows, under date of November 11, with reference to the sales of West Indian Sea Island cotton:—

Since our last report only a limited business has been done in West Indian Sea Islands, chiefly on account of the absence of desirable stock.

High grades of American Sea Island are commanding full prices, but the crop being a poor one, the lower qualities are depressed.

About fifty bales West Indian Sea Islands have been sold, comprising Antigua, 19*d*; Barbados, 13*d*. to 20*d*.; Nevis, 17½*d*; and St. Croix, 17*d*.

Low grades and stains will rule at much lower prices owing to the large quantities of such in American crop

### COTTON IN SANTA CRUZ.

This season's cotton crop is reported to be much more promising than was anticipated earlier in the year. Owing to the very severe drought the seed could not be planted before September; some good rains have since fallen and the fields are now said to be looking in very good condition. Fortunately, pests have not given much trouble, and planters are now getting enthusiastic about their cotton.

This year, about 1,200 acres have been planted, as against about 800 acres last season, and it is expected that next season there will be a very substantial increase in the acreage.

### SEASONABLE NOTES.

In several of the West India Islands cotton picking has now been in progress some time, and it is satisfactory to note that the crop being reaped is expected to be large, and the quality of the cotton good.

Planters are again advised to be most careful with their crop. It should be insisted upon that pickers do not mix dirty and clean cotton together; a pocket should always be provided on the picking bag and the dirty cotton placed in this as it is gathered.

Care should be taken to remove all broken leaves from the cotton before it is put into the bag. Seed-cotton should never be picked from bolls which are not properly opened and perfectly dry.

Pickers should be made to pass up and down the rows in the performance of their work, and should never be allowed to cut across them.

Cotton picked during the day should always be examined

in the evening when it is brought into the house, and any picker bringing in dirty cotton should be made to go over it the following morning, before being allowed to commence picking again.

It is very important that all cotton should be perfectly dried. At the beginning of the season, more especially, it should be sunned until the seeds can be cracked with the teeth.

Before sending the seed-cotton on to the ginnery it should be bulked for three to six weeks, during which process the quality of the lint is improved.

### FIRST, SECOND, AND THIRD PICKING COTTON.

The question of the relative qualities of the first, second, and third picking cotton should be of general interest to cotton planters. In the first place a knowledge of the relative merits of the cotton from each picking is a guide to the growers in mixing and shipping their crop. And in the second place, this knowledge should enable the planters to form a more correct conclusion as to the advisability of growing ratoon cotton.

A very careful examination has been made, by the officers of this Department, of seed-cotton obtained in the first, second, and third pickings respectively, from a number of individual plants.

The result of this examination shows that there is a great difference in the quality of the cotton from the separate gatherings. The best cotton is obtained from the first picking. The length of the staple is greatest at the first picking and it is found to decrease at each subsequent gathering. At the second picking there is less weak fibre present, but at the third gathering this weak fibre may be present to a very abnormal extent. The character of the cotton from this last picking is probably due to a great extent to the dry conditions which prevail during the time it is developing.

It might appear that the second picking cotton, on account of the low proportion of weak fibre present, should be of a very superior quality; but, unfortunately, it lacks lustre, and is rather brittle.

The great drawback of the third picking cotton lies in its very wasty character.

From this, the conclusion should be drawn that the several pickings should be kept entirely separate, and shipped as different grades.

Further, in order that the high position West Indian cotton has gained upon the market may not be lost, it would be well not to produce cotton of such a wasty nature as ratoon cotton is proving itself to be.



## MANUFACTURE OF PANAMA HATS.

A brief article containing information as to the methods of manufacture of the popular 'Panama' hats appeared in the *Agricultural News* (Vol. III, p. 310). The fuller particulars given below have been abstracted from a lengthy descriptive account published in the October number of the United States Monthly *Consular Reports*.

It is stated that the manufacture of these hats has increased at such a rate during the past few years that it is now one of the chief industries of Ecuador.

The plant (*Carludovica palmata*), furnishing the material from which the Panama hats are made (see Fig. 28) grows wild in the low, damp forests of Ecuador, and is extensively cultivated in some parts, as well as in certain districts of Colombia. It is fully developed at eighteen months old, and is said to live from forty to fifty years. Young leaves are taken from the plant every month, just as they begin to unfold, the stalk being cut some distance below the leaf to facilitate handling.



FIG. 28. CARLUDOVICA PALMATA.

The leaf is unfolded, and is first torn into plaits about  $\frac{1}{2}$  inch wide (the outer one or two plaits being rejected), and finally into shreds of varying sizes (according to the fineness of straw required) by means of an instrument consisting of a piece of wood in which needles are properly arranged. These shreds, constituting the straw, are then submerged in boiling water for some time, being afterwards dried, first in the shade and subsequently in the sun.

The best 'Toquilla' palms, as they are termed locally, are grown in the vicinity of Manglaralto in Ecuador. This district, besides providing for the local demand, supplies the manufactures of one or two neighbouring provinces, and exports considerable quantities to Peru and other places. The 'straw' sells at 65c. to 70c. per lb., this being five times the price obtained six years ago. This enhanced price is due to the largely increased export of hats, the production

not having kept pace with the increased demand. The 'straw' is classified for market into four grades—coarse, medium, medium fine, and fine, the finer and more delicate grades commanding the highest prices.

The hats made in the provinces of Azuay and Canar in Eastern Ecuador, are stated to be of inferior quality, on account of the straw being used in its natural state without any preparation. In the province of Guayas, too, the hats are of an inferior class, but the workmanship is superior.

The finest and best quality of Panama hats are said to be those produced in the province of Manabi. These are noted for fineness of fibre and excellent workmanship, and command the enormous price of \$100 to \$125 each. Only a few of these high-grade hats are produced, however, as not many weavers understand the art of making them, and the demand is naturally small. From five to six months is stated to be required to make one of them, as work on this class of hat can only be done during certain hours of the day.

The value of the Panama hat exports from Ecuador in 1906 was almost double that of the 1905 exports, the figures being \$680,813 in the first year and \$1,200,998 in 1906. The value of the hats exported to England in 1906 was almost four times the value of the shipments sent in the previous year.

## CARNAUBA WAX.

A note on this substance appeared in the *Agricultural News* (Vol. II, p. 307), and it was there stated that specimens of the tree producing the wax are to be found in the Botanic Gardens at British Guiana, and that seeds have been distributed from them to the Botanic Stations throughout the West Indies. In a later issue of the *Agricultural News* (Vol. III, p. 284) it is mentioned that inquiries had been received in Demerara for this product, and judging from the particulars given below, which have been taken from the latest British *Consular Report* on the trade of the Brazilian State of Bahia, carnauba wax may easily become a valuable minor article of commerce. The Consul writes:—

The substance which figures amongst exports from Bahia under the term 'carnauba' is a species of vegetable wax, which is obtained from a palm tree (*Copernicia cerifera*, Mart.). The palm in question grows wild and in abundance throughout all parts of this State.

Carnauba wax is an article of high commercial value. It has been used during many years past for the manufacture of fine-quality candles, also during latter years as a basis for boot polish. Quite recently, it appears, the discovery has been made that carnauba wax is the substance most suitable for the manufacture of records for phonographs and gramophones, and the additional demand thus created has had the effect of materially increasing the value of the wax in question. At the present time the market prices of carnauba wax range from £170 to £225 per ton.

The value of the wax is dependent upon three factors—tint, texture, and richness in oil, and for trade purposes the wax is graded into three qualities. The first quality is of uniform pale cream tint, smooth and homogeneous in texture, and is rich in oil. The inferior qualities are darker and less uniform in colour, somewhat porous in texture and less rich in oil.

It is probable that it will be discovered, as time goes on, that carnauba wax can be made to serve many useful purposes in addition to those which I have specified.



## EDITORIAL NOTICES.

Letters and matter for publication, as well as all specimens for naming, should be addressed to the Commissioner, Imperial Department of Agriculture, Barbados.

All applications for Copies of the 'Agricultural News' should be addressed to the Agents, and not to the Department.

*Local Agents:* Messrs. Bowen & Sons, Bridgetown, Barbados. *London Agents:* Messrs. Dulau & Co., 37, Soho Square, W., and The West India Committee, 15, Seething Lane, E.C. A complete list of Agents will be found on page 3 of the cover.

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## Agricultural News

VOL. VI. SATURDAY, NOVEMBER 30, 1907. No. 146.

### NOTES AND COMMENTS.

#### Contents of Present Issue.

Observations made by an officer of the Imperial Department of Agriculture, during a recent visit, as to crop prospects and general agricultural conditions at present prevailing in the Leeward Islands, are recorded in the editorial of this issue.

Information as to cane crop prospects in Demerara, present conditions in Cuba, as well as particulars relating to sugar production in Southern China, are given on p. 371.

The report of the British West Indian Fruit Company for the year 1906-7, of which a review is reprinted on p. 372, is not very favourable, although the adverse balance on the year's work is less than that of 1905-6.

The three chief varieties of cacao grown in Jamaica and other parts of the West Indies are compared in a brief article on p. 373. Particulars as to the results of broom corn shipments to Canada from Antigua and Montserrat will be found on the same page.

A note as to the comparative qualities of first, second, and third picking cotton, a report as to the crop prospects in Montserrat, an article discussing the advantages of heavy seed, as well as Seasonable Notes, etc., are given on pp. 374-5.

The smaller cotton worm, which has been noticed in Barbados during the past three seasons, is described on p. 378, and particulars are also given on the same page as to the appearance of the cotton worm in St. Vincent, and methods of treatment adopted.

#### Agricultural Outlook in St. Vincent.

The agricultural conditions and prospects at present prevailing in St. Vincent are very promising, according to the *Kingstown Times*. Cotton picking is in progress, and it is mentioned that the average amount gathered on many estates has exceeded 1,000 lb. daily. Planters have so far experienced no difficulty in securing a sufficient supply of labour to gather their cotton crop, but doubts are expressed as to whether the available supply will be equal to the demand made upon it when picking is at its maximum. Very much depends on the results of the present season's cotton crop, and hopes are expressed that prices will not fall far below those of last year.

Arrowroot cultivation is reported to be well advanced, and digging commenced early in November on some plantations. Provisions and fruit are described as being plentiful, and everything, in fact, points to a record planting season.

#### Gambier in Dominica.

The Gambier plant (*Uncaria Gambier*) introduced into Dominica some years ago is still thriving at St. Arment estate. The Imperial Commissioner of Agriculture, on his recent visit to Dominica, was shown a flowering specimen by Dr. H. A. Alford Nicholls. The Gambier plant, which is largely cultivated in the Straits Settlements, yields a valuable tanning and dyeing material, largely used in commerce. Finer qualities of the extract from the leaves are also used in medicine on account of its astringent properties.

In the *Agricultural News* (Vol. II, p. 408), it is stated that in 1891 an attempt was made to introduce the systematic cultivation of this plant into the West Indies. The efforts, however, were unsuccessful, although future attempts in this direction may perhaps be attended with better success.

In the Malay States, Gambier is chiefly grown as a catch crop with pepper.

#### Canada and the West Indies.

The efforts that are now afoot to promote closer trade intercourse and a greater exchange of produce between Canada and the West Indies were briefly discussed in a recent issue of the *West India Committee Circular*. While recognizing the value of the Canadian Exhibitions as useful agencies in extending a knowledge of the resources of the West Indies for intercolonial trade, the *Circular* lays stress on the necessity for improved shipping and cable services if this trade is to be developed. At present the means of communication between these islands and Canada is more or less unsatisfactory, as well as being insufficient, but it is hoped that arrangements may be brought about in the near future which will result in better shipping facilities. Such an improved service will no doubt aid largely in the development—anticipated by the *Circular*—of an export trade to Canada from these islands in oranges, limes, bananas, cotton, coffee and other agricultural products.



### Trinidad and Tobago School Shows.

School Horticultural and Needlework Shows are now held at five centres in Trinidad and Tobago, and there can be no doubt that these annual competitive gatherings do much to stimulate the interest of the pupils in the horticultural teaching given at the schools, while they also exercise a considerable influence towards the improvement of the quality of the vegetables, fruits, etc. produced, not only in the school gardens, but also by the peasant proprietors of the neighbourhood, for whom a section is provided in each show. Apart from horticultural produce, these shows provide classes and award prizes for garments and other specimens of needlework from girls at the schools, and there are also classes for domestic animal exhibits.

A sum of \$350 is annually provided out of public funds, to be awarded in prizes in the schools' section (only) of the shows for the best display of vegetable products, specimens of sewing, etc., while the Trinidad Agricultural Society contributes another \$250 yearly for award in the peasant proprietors' section, where, however, the schools are also allowed to compete. Further, the Trinidad Society for the Prevention of Cruelty to Animals offers, each year, prizes to the value of \$200, to be awarded in connexion with the classes for domestic animal exhibits. In addition to the money contribution, the Agricultural Society also offers a silver medal to the school sending the exhibit which is judged to be the best display at all the shows of the year.

### Tourist Season in Jamaica.

For the information of many inquirers, the *Jamaica Daily Telegraph* recently published a statement (prepared by Mr. J. F. Brennan of the Meteorological Service) as to the climatic conditions prevailing in the island during the 'tourist' season, from November to March inclusive.

The mean temperature naturally falls from October onwards to February, the average near the coast being about 80° F. in November, 78° in December, 76° in January, and February, rising again to 78° in March. During these months the range of temperature near the coast is from 17° to 20° in the twenty-four hours.

As regards wind, the easterly and north-easterly trades, which continue to be felt through November along the greater part of the north-coast, are, in December and January, displaced by cool and refreshing northerly breezes. November is stated to be the month during which the minimum breeze is experienced on the south coast of the island, the wind increasing each month after this up to March.

Comparatively heavy rains are usually experienced in the north-east of Jamaica, more especially in the parish of Portland, during November and December, but in the south of the island, dry weather is the rule. In January, which is said to possess the most agreeable climatic conditions of any month of the year, the rains of the north-east begin to decrease. February is the driest month of the year in all parts of the island, while March and early April are mentioned as the best times for trips to Blue Mountain Peak.

### Jamaica Grape Fruit in London.

The London *Daily Graphic* of October 12 last says: Jamaica continues to lay siege to the English fruit market, and yesterday at Covent Garden disposed of its first consignment of grape fruit. There is a great scarcity of grape fruit at the present moment, and the Jamaica contribution hits the market at the top of its prices. Seventeen shillings and sixpence was the price which the crates, holding fifty grape-fruits each, fetched at auction, and this is easily a record in high prices.

### West Indian Bulletin.

The second number of Volume VIII of the *West Indian Bulletin* has been issued in quick succession to No. I (see last number of *Agricultural News*), and contains the papers relating to the cacao, fruit, lime juice, cotton, rice, rubber, and tobacco industries that were to have been read at the West Indian Agricultural Conference held in January last.

In the first paper an account of the results of the manurial experiments with cacao carried out in the islands of Grenada, Dominica, and St. Lucia, under the direction of the Imperial Department of Agriculture, is given by the several officers directly connected with those experiments. There is a brief article—the Yield of Cacao in Trinidad,—by the Hon. Carl deVerteuil, and Mr. H. A. Ballou, M.Sc., contributes a paper relating to the attack of cacao trees by thrips, and giving particulars as to the best method for the destruction of these pests.

The West Indian orange industry and the production of early oranges in Jamaica are discussed in two papers, by Dr. H. A. Alford Nicholls, C.M.G., and the Hon. T. H. Sharp respectively, while a paper by Mr. G. L. Lucas contains a good deal of information on pine-apple growing in the West Indies, best methods of cultivation, etc. The fungus diseases of pine-apples are discussed in an article by Mr. F. A. Stockdale, B.A. Information of considerable interest to those connected with the lime juice and citrate of lime industry will be found in the brief articles relating to this subject, by the Hon. Francis Watts, C.M.G., and others.

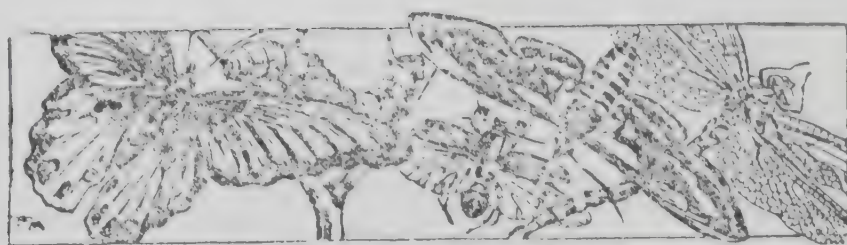
The papers relating to the cotton industry are by Mr. J. R. Bovell—Recent Results in the Cultivation of Cotton at Barbados; by Dr. Francis Watts—Cotton Industry in the Leeward Islands; and by Mr. W. N. Sands—Sea Island Cotton Cultivation at St. Vincent.

The phenomenal extension of the rice-growing industry in British Guiana is a matter which has received considerable attention of late, and in this number of the *Bulletin* there is an article by the Hon. B. Howell Jones entitled, 'Experimental Rice Cultivation in British Guiana.'

The rubber industry of the West Indies is discussed in four articles, the first three containing a good deal of information as to progress in Jamaica, Trinidad, and British Guiana respectively, while the fourth relates to the results of tapping rubber trees at Dominica and St. Lucia.

The last article is a lengthy one by the Hon. W. Fawcett, B.Sc., F.L.S., entitled, 'Tobacco in Jamaica.'





## INSECT NOTES.

### The Smaller Cotton Worm.

In addition to the ordinary cotton worm (*Aletia argillacea*), there is in Barbados a second insect, the larva of which appears as a cotton worm, at certain times and on certain estates.

This insect was first noticed in Barbados in 1903, when a larva was captured on cotton. This caterpillar was fed on cotton leaves at the laboratory of the Imperial Department of Agriculture, and the adult obtained.

In 1905, the cotton planters in St. Philip's parish observed that although worms were plentiful in the cotton fields, no pupae were to be found, and the caterpillar was slightly different in appearance from the ordinary cotton worm. In 1906, and also during the present season, this insect has again appeared.

Specimens of the adult moth, the pupa, and the larva were sent to the United States Department of Agriculture for identification, and the insect was determined to be *Aletia luridula*, Guen. It will be seen that it is closely related to the cotton worm, being another species in the same genus.

There are considerable differences in appearance and habit between these two cotton worms. As the common name which is used here would indicate, *Aletia luridula* is a smaller insect than *Aletia argillacea*. This is noticeable both in the larva and in the adult.

The larva of the larger cotton worm has the dark stripe down the back, and although this may sometimes be very faint it can still be seen. This stripe is wanting on the larva of the smaller cotton worm.

The larva of the smaller cotton worm is often to be found concealed beneath the bracts that surround the flower and boll. The pupa is formed in the ground, and it is on account of this habit that planters have been at a loss to understand why they could find no pupae attached to the leaves, even though the worms were plentiful.

Just previous to pupating the larva of the smaller cotton worm assumes a slightly reddish colouration, which is quite marked at the time it enters the ground.

The remedies are the same for both these insects since their feeding habits are similar: they both feed on the leaves and can be controlled by the use of Paris green and similar poisons.

### The Cotton Worm in St. Vincent.

Mr. W. N. Sands, Agricultural Superintendent at St. Vincent, in a letter to the Imperial Commissioner of Agriculture, states that in the recent attack of cotton worm in that island only a small area—about 8 acres—was at all badly damaged, and that no further attacks are reported.

It is further stated that reports are being circulated by people coming to St. Vincent from other islands, that a mixture of 1 part of Paris green with 30 parts of lime is as effective as any, and also that lime without Paris green is a good insecticide for the cotton worm.

It has been stated many times in the publications of the Imperial Department of Agriculture that the lime is used with the Paris green merely in order that it may be seen where the poison mixture has been applied, to prevent waste, and to further ensure that no plants shall be missed in the distribution of the poison.

Lime is not used as a poison, and the cotton worm could not be controlled by the use of lime alone. Paris green and London purple contain arsenic, and this is the poison on which the efficiency of these insecticides depends. Experience has taught that the stronger mixtures (1 lb. Paris green to 6 lb. lime) are most satisfactory.

There can be no economy in using a larger proportion of lime, because it is not the amount of mixture used per acre that effects the destruction of the cotton worm, but the amount of Paris green or of London purple. Since it has been found that the cotton worm can be effectively controlled by the use of 1 lb. of Paris green per acre at each application, when mixed with 6 lb. of lime, there can be no object in using more lime, unless the saving in Paris green is sufficient to make up for the extra amount of lime and the extra labour required in distribution.

In those islands where cotton has been severely attacked by the worm during the past few years, most planters have learned that it is best to adopt a tried remedy, and with greater experience it will also be found in St. Vincent that the experience of the most successful planters is the best guide, and reports such as those mentioned above, that Paris green mixed with the larger quantities of lime, as well as lime alone, are efficient against the cotton worm, do not come from the experience of those planters who are most successful in combating this pest.

## RUBBER ESTATES IN TRINIDAD AND TOBAGO.

The *India Rubber World* of October 10 contained the following note relating to rubber production in Trinidad and Tobago:—

Four estates are mentioned as producing *Castilloa* rubber on a commercial scale in the islands of Trinidad and Tobago in the British West Indies. They are:— (1) Monte Cristo, owned by H. Monceaux, in Trinidad; (2) Lorgua, owned by Adrien de Verteuil, Trinidad, (last shipment 1,145 lb.); (3) Richmond, owned by Captain Short, Tobago, (4) Louis D'Or, owned by a company, T.L.M. Orde, manager, Tobago, (last shipment 1,200 lb.). The first two companies are of French origin, and make shipments to Paris; the other two send the produce to London. Recent shipments sent to London of *Castilloa* sheets dried, and pressed into blocks, brought 4s. 4d. per lb. We are informed, that several estates with 10,000 to 30,000 rubber trees each, will soon be coming into annual production.

## DEPARTMENT NEWS.

The Imperial Commissioner of Agriculture, who paid a visit to Demerara for the purpose of delivering an address on the possibilities of extended commercial intercourse between the West Indies and Canada, returned to Barbados by the R.M.S. 'Esk' on Tuesday, November 19. On Friday, November 22, Sir Daniel Morris delivered an address on the same subject to a gathering of planters and merchants at the Planters' Hall, Barbados.



## COTTON INDUSTRY IN MONTSERRAT.

Mr. W. Robson, Curator of the Botanic Station, Montserrat, writing under date November 16, sends the following particulars with reference to the cotton industry in that island:—

I am forwarding you herewith, a few remarks on the present condition of the cotton crop in Montserrat. The area this year under cotton has extended to at least 1,800 acres, as compared with 1,050 of last season. About 200 acres is land newly cleared from forest, and the cultivation by the peasants represents about 200 acres. I estimate the number of this latter class of cultivators at 400.

The fields have now so far advanced that it is safe to predict a good crop, providing the rainfall is not excessive during the next two months. The plants have grown so well in all parts of the island that it is difficult to say which district is the most suitable for the crop.

The principal drawback seems to be wind, and where estates are in any way exposed, the promise of crop seems to be correspondingly low. Fortunately, there has been an absence of high winds since the middle of September, which has enabled the plants to grow as tall as last year with a much less rainfall. Picking commenced in the middle of October from the earliest fields and will soon be in full swing.

The cotton in the northern district, which is considered the driest in the island, is looking remarkably well, and will give excellent returns, while the prospects on the windward side have never been so bright. The whole of the south district, from the town of Plymouth to O'Garas, may be said to be under cotton. The cultivation given by the peasants, the majority of whom live in the district, is very commendable, and during the growing season it has been the exception to find a neglected or even a weedy patch of cotton.

Cotton worms are now very troublesome and persistent dusting is required to keep them in check. The windward and south districts have had the most severe attacks. At the north, except to a slight extent at Blakes, they have not yet been seen. The leaf-blister mite has not made much headway though more or less present every where; and black-boll has not been heard of.

Since the beginning of the current month, I have visited nearly every district where the peasants have plots of cotton, and I have given practical demonstrations in the dusting of the cotton plants to counteract the cotton worm. One hundred and fifty pamphlets have also been distributed amongst the peasants, dealing with the treatment of the cotton worm.

## THE ADVANTAGE OF PLANTING HEAVY COTTON SEED.

This subject is one that has been very carefully considered by Messrs. H. T. Weber and E. B. Boykin, and is by them discussed at length in the October number of the *Cotton Trade Journal*. The importance of using heavy seed is well established with many crops, and this fact has stimulated the above two workers to start experiments with the object of determining if it is also true with reference to cotton.

To quote from this article: To ensure vigorous development of plants it is important to have a large quantity of nutriment stored in the seeds. Heavy seeds are the only ones which meet this condition, and as a rule the heavier they are in proportion to their volume, the higher is the percentage of germination, the more rapid is the growth of the resulting plants, the more resistant are they to disease and adverse conditions, and the greater is their productive-

ness. Light seeds, on the other hand, germinate poorly and produce plants of low constitutional vigour, which are readily attacked by disease and which possess a comparatively low degree of productiveness.

Some difficulty was experienced in obtaining a suitable seed separator, but ultimately a scheme was devised which has given very satisfactory results. The principle involved is simply the removal of the lighter seeds by means of an air current. Special arrangements had to be made when seed of Upland cotton was being separated, owing to the amount of fuzz which is attached to the seed, but the Sea Island seed being clean, with the exception of a little fuzz at the tips, it was possible to separate it without treating it in any special way before putting through the separator.

In the separating machine the seeds are fed from a hopper on to a vibrating screen, which catches the wads of seed and any large bits of foreign matter, and discharges them before they reach the flue. Individual seeds are allowed to pass through its meshes to another vibrating screen which deliver them into a short flue, where they are brought into contact with a current of air driven by a fan from below; this carries the light seeds out through the top of the flue and allows the heavy ones to drop through into a box below. The separation depends upon the fact that the effect of the blast exercises itself in a different manner upon the seeds according to their size and specific weight. Those seeds having the greatest weight relative to their size drop through the blast, while the light ones having a large surface in proportion to their weight are unable to resist the blast, and are therefore carried off through the flue. In order to secure the most satisfactory separation it is necessary to have the machine running at a uniform speed which has been tested and found to give good results.

To determine the relative percentage of germination, seeds were separated into four grades: heavy, medium, light, and very light, and it was found that a large percentage of all grades germinated, but that the highest percentage of germination was in the case of the heavy seeds. It was observed, however, that the light seeds germinated more quickly than the heavy ones, but striking differences were seen in the resulting plants. Many of those from the light grades were yellow and unhealthy in appearance, while those from the heavy grades appeared to be much stronger and more vigorous. Careful tests were made with the heavy seeds and the unseparated seeds, and in one test it was found that the heavy seeds yielded 10·9 per cent. more seed-cotton than the unseparated seed. In another experiment the yield was 8·25 per cent. more than the unseparated seed. These experiments which were carried on under actual field conditions gave a substantial difference in favour of the heavy seeds, and as the cost of separation was very small, the extra cotton obtained was nearly all net profit. As yet, the writers have made no field tests of heavy and light Sea Island cotton seed, but it is most probable that very similar results would be obtained with Sea Island seed. It was possible to separate it into grades as they separated Upland cotton seed, and it thus appears that there would be no difficulty in the separation itself. It is claimed that an additional advantage is gained by the separation of Sea Island seed, as this process will eliminate all fuzzy seeds as they are easily caught in the air and blown out with the light seeds.

With reference to this work, it may be useful for similar experiments to be tried in these islands with Sea Island cotton seed, as any scheme which makes it possible for planters to obtain higher returns without a corresponding rise in expense cannot be neglected.





## GLEANINGS.

The exports of cacao from Jamaica during 1906-7 were 50,057 cwt., this being a very satisfactory increase as compared with 1905-6, when the figures were 32,587 cwt.

The present season's sugar-cane area in Mexico is reported as showing a considerable extension compared with the acreage of past years. The crop prospects are stated to be excellent. (*Louisiana Planter*)

During the month of October of the present year, British Guiana exported 15,276 tons of sugar, of which 13,956 tons were shipped to Canada and 1,316 tons to the United Kingdom. In October 1906, the quantity of sugar exported from British Guiana was 14,739 tons.

During the year 1906-7, fines to the extent of no less than \$2,408 were imposed in British Guiana upon sellers of adulterated foods and drinks. By far the greater portion of this was paid by dairymen who had been convicted of watering their milk. (*Government Analyst's Report*, 1906-7.)

The Liverpool School of Tropical Medicine has awarded the Mary Kingsley medal to Dr. Charles Finlay, chief sanitary officer of Cuba, for his great services to humanity in discovering the fact that mosquitos are responsible for the transmission of yellow fever.

Both avocado pears and papaws are now being exported from Hawaii to the United States. It is reported that the shipments of avocados arrive at Chicago in very good condition, and that the fruits sell in the market at from 30c. to 45c. each. (*Chicago Record Herald*.)

Bud rot is very prevalent in the cocoa-nut plantations of Cuba, and is causing a continuous falling-off in the yield of nuts. The decrease in the output is so considerable that it represents a monthly loss of \$10,000 compared with the best days of the industry. (*Cuba Review*, October.)

In a letter to the Imperial Commissioner of Agriculture, dated September 14 last, Messrs. Pickford and Black stated that from January to the end of August of the present year, they had already shipped more flour from Canada to the West Indies than was carried during the whole of the year 1906.

Messrs. Henry. W. Frost & Co., of Charleston, writing under date of November 2, report the total quantity of Sea Island cotton that has been placed on the market up to date during the present year as 13,568 bales, compared with 8,370 bales received up to the same time last year.

The growing importance of 'Guayule' rubber (*Parthenium argentatum*) as an article of produce in Mexico is indicated by the fact that the quantity exported during 1906-7 was valued at £357,050, as compared with shipments to the value of £90,715 in 1905-6.

Ginning operations are reported to have begun at the St. Vincent Central Cotton Factory on November 11. Two gins recently erected were tried and gave complete satisfaction. Twenty-three bales were ginned as the result of the first two days' work. (*St. Vincent Times*.)

The experiments with Sea Island, Egyptian, Caravonica, and local varieties of cotton have been continued during the past year by the British Guiana Board of Agriculture. The failure so far experienced with imported varieties, especially Sea Island and Caravonica, is now regarded as being due to fungoid diseases affecting the plants.

British India last year imported over 15,000,000 cocoa-nuts, chiefly from the Maladive Islands, Straits Settlements, Ceylon, and East Africa. Cocoa-nut oil, however, is exported to the extent of 85,096 cwt. annually, India furnishing Great Britain with the greater part of her requirements in this respect. (*U. S. Consular Reports*.)

The teaching of practical agriculture is being extended in the public elementary schools of Trinidad. During the the year 1906-7, the number of schools examined in this subject was 203, as compared with 195 in the previous year. Sixty-seven schools obtained the highest award of 'Very Good' as the result of inspection.

One or two scholarships at the St. Lucia Agricultural School are now vacant. These offer a good opportunity to healthy, intelligent lads, who are anxious to undergo a course of training with the view of taking up agricultural work. Candidates must be about sixteen years of age. Applications should be sent to Mr. J. Chisnall Moore, at the school.

The Hawaiian Agricultural Experiment Station is making trials with no less than 150 varieties of rice from different parts of the world in comparison with local varieties. Valuable information should result from these experiments, as rice growing promises to be an important industry in Hawaii.

The *Louisiana Planter* of October 19 gives some details as to the amount of sugar produced by various South and Central American States. Peru produces about 150,000 tons of sugar per annum, the Argentine Republic 125,000 tons, and Mexico about 110,000 tons. Guatemala, San Salvador, Nicaragua, and Costa Rica aggregate about 20,000 tons, and Venezuela 3,000, the total reaching 408,000 tons.

Samples of tobacco grown at the Agricultural Experiment Station, Hawaii, have been pronounced by experts to be of good burn and flavour, and as suitable for wrapper leaves in cigar making. The soil and climate of a portion of Hamakua are stated to be ideally suited for tobacco growing. In this district the mornings are sunny, but clouds set in before noon almost every day of the year, disappearing again, however, before evening. The tobacco is thus virtually shade-grown.





**BRITISH GUIANA: ANNUAL REPORT OF THE BOARD OF AGRICULTURE, 1906-7.** By E. W. F. English, B.A., Acting Chairman.

This report contains an account of the subjects dealt with by the Board at its four general meetings. The work done at the meetings of the various committees is also summarized.

During the year the Board imported into the colony a pure-bred Guernsey bull, and made arrangements for the importation from Canada, during 1907-8, of a pure-bred Shorthorn bull, some black-faced Shropshire rams, and a Berkshire boar. Several young bulls and some half-bred Shropshire rams were disposed of at a Live Stock sale, the total amount realized being \$432.91.

It is reported that the provision of pure and half-bred bulls by the Board, and the easy conditions under which their services are available to stock owners, are doing much to improve the general character of the cattle of the colony.

A jack donkey of Spanish breed was imported by the Board during the year, at a cost of \$662.14.

The Sugar-cane Experiments Committee has obtained and published returns, showing that the area under cane cultivation in the colony, during 1906-7, with varieties other than Bourbon, has increased to 28,800 acres. It is worthy of note that the acreage devoted to the seedling cane D. 625 has increased from 3,357 to 6,600 acres, or practically 100 per cent., while the area of cultivation of the Barbados seedling B. 208 has also increased 50 per cent. During the year, the seedling D. 145, as well as the two above-mentioned, have, it is stated, maintained their superiority as sugar producers to the Bourbon variety.

Under the direction of the Subsidiary Products Committee, experiments in the cultivation of such products as rice, rubber, cotton, fibre plants, etc. have been carried on at the Onderneeming Agricultural School.

**BRITISH GUIANA: REPORT OF THE GOVERNMENT ANALYST FOR 1906-7.**

During the year 5,284 samples were analysed at the Government laboratory, this being a decrease of 204 as compared with the number examined in the previous year. This falling-off is attributed chiefly to the fact that, owing to alterations in the tariff of the colony, the Comptroller of Customs did not find it necessary to submit such a large number of samples of tobacco for examination. The Comptroller of Customs, however, still sent the largest number of samples for analysis, viz., 1,611, the Inspector General of Police coming next with 1,037, while 700 were received from the Board of Agriculture.

Of the 1,261 samples of food and drink examined, no less than 17.4 per cent. were found to be adulterated. Milk constituted the great bulk of these samples, and adulteration was shown to have taken place in 16.1 per cent. of the cases.

This represents a decline in the number of adulterated samples as compared with last year, when the figure was 17.4 per cent. Heavy fines have been levied during the past year on dealers convicted of watering their milk, and, as pointed out in the Report, the profitable nature of the fraud is proved by the fact that these persons can afford to pay the fines.

**TRINIDAD: REPORT OF THE FOREST OFFICER FOR 1906-7.** By C. S. Rogers.

The greater part of this report consists of a detailed account of the progress that has been made during 1906-7 in marking out the boundaries of the various Forest Reserve areas in Trinidad and Tobago. Boundary lines to the extent of 65½ miles were laid out during the year. Previous to this it is stated that 181½ miles had already been completed, and there now remain 132½ miles still to be marked out.

The question of cedar production in Trinidad is referred to, and it is stated that the Forest Conservancy Board is anxious to devise some means for preventing the wholesale destruction of cedar on Crown lands, and of preserving the remaining supply. With this end in view, the rules relating to the cutting of timber on the Government lands have been amended, and licences to cut cedar are issued, only on condition that the timber is converted into boards or planks in the forest, and that it is for use within the colony.

The revenue from timber and other forest produce during the year amounted to £2,147, as against £1,872 last year, showing an increase of £275.

**HAWAII: REPORT OF THE AGRICULTURAL EXPERIMENT STATION, 1906.** By Jared C. Smith, Special Agent-in-Charge.

This illustrated report of eighty-eight pages gives a very readable account of the routine and research work carried on at the Hawaiian Station by the various officers during the year 1906.

An experiment was made to demonstrate the possibility of growing early potatoes for the local market. The crop—although not a very good one—was readily disposed of, the demand exceeding the supply.

The fruit experiments that are being carried out were described in the last number of the *Agricultural News* (Vol. VI, p. 356).

Trials of several varieties of cotton were made during 1906; the yields of the Upland varieties were not very promising, but with the Peruvian and Sea Island varieties the quality was good and the yield large.

Experiments have been made in the cultivation of grasses and other forage plants from Arizona, New Mexico, Australia and elsewhere. Promising results were obtained. In addition the experimental cultivation of rice, tobacco, grapes, rubber, and cacao also received attention.

An interesting feature in the work of the station is that connected with the collection of edible sea-weeds, which has been made in the shallow waters of the islands. Sea-weeds of this character abound around the coasts of the Hawaiian Islands, and the station is undertaking a series of chemical studies and cooking experiments with them, in the hope of assisting to build up a local industry in these marine food plants.

The reports of the Entomologist and of the Horticulturist are appended.



## SCIENCE NOTES.

### The Kus-Kus Root.

The particulars given below as to the useful kus-kus root, which, it will be noticed, is grown in Jamaica, among other places, appeared originally in the September number of the *Quarterly Journal* of the Liverpool University Institute of Commercial Research in the Tropics:—

The kus-kus root is a rhizome (bearing adventitious roots) of *Andropogon squarrosus*, a member of the Gramineae. It is a vigorous plant, growing in India and the Philippine Islands. It is also cultivated in Jamaica. The rhizome and roots (particularly the latter) contain an ethereal oil. The roots are known as Kus-kus, Khus-khus, or Vetiver.

The plant has been used medicinally for Asiatic cholera. Its taste and smell are due to an ethereal oil termed in pharmacy, 'Oleum aether. Vetiveriae.' This is used in perfumery in India, and also in Europe. The oil occurs principally in resinous material lying in a layer of cells just internal to the endodermis, and also in the parenchymatous cells forming the septa of the cortex. In many vessels and in broken-down groups of cells, it occurs as a yellowish-brown mass, which when treated with alkalis resolves itself into drops of an oily resinous substance. The ethereal oil is steam-distilled from roots which have previously been macerated in water.

The yield of ethereal oil is from 0.4 to 0.9 per cent. The specific gravity of the oil is 1.02 to 1.03. It is soluble in 80 per cent. alcohol. The oil is very thick and tenacious, varying in colour from green to straw-yellow, yellowish-brown, and dark-brown. In India the long adventitious roots are used for making mats, and are also ground into powder which is placed among clothes to prevent attacks of moths, etc.

### Powers of Resistance of Anthrax Bacilli.

The particulars given below as to the great vitality and powers of resistance under adverse conditions, of the spores of the Anthrax bacillus appeared in the *Medical Times and Hospital Gazette*, of September 28 last:—

Santi Sirena (*Archivio per le Scienze Mediche*, abstract in *New York Medical Record*) has shown that spores of the bacillus anthracis, when dried in the hot sun in free air, live for nineteen days; in the thermostat in dry air they live 406 days; when dried by chemicals they live a longer time. Creolin, up to 60 per cent. strength does not destroy them, but when used pure it kills them in twenty-four hours. The bacilli are killed in fresh blood after ten minutes by 10 per cent. creolin, and after twenty minutes in the spleen of a diseased animal. In sterilized garden earth they lived fifteen years. In damp earth they lived four years. In earth saturated with moisture they lived thirteen years. In sea-water they lived eight years. In sterilized water they lived more than eight years. In pregnant animals they passed from the mother to the foetus by way of the maternal and foetal placental vessels. They were found in the chorion and in the placenta in great numbers. There were alterations of the muscular and epithelial layers of the uterus, consisting of hyperemia, dilatation of the vessels, and extravasation of blood.

## AGRICULTURAL EDUCATION IN TRINIDAD

In the *Annual Report*, 1906-7, of Mr. J. H. Collens, Inspector of Schools for Trinidad, the following reference is made to the teaching of practical agriculture in the elementary schools of that colony:—

As seven years have now elapsed since practical agriculture was added to the curriculum, it may not be amiss briefly to review what has been the effect of the change. In the first place, the new subject—being taught out of doors—forms an agreeable relaxation after the drudgery of book-work in a sometimes vitiated school-room atmosphere. It is one fraught with frequent surprises, and offering an endless variety of interesting problems to the observant student. An amount of useful practical knowledge is acquired by learning from actual experience the best methods of preparation of the soil, use of manures, the art of sowing, planting, gathering, the manner of dealing with insect pests and plant diseases. Surely, too, the pleasure and profit derived from children reaping the fruits of their labours count for something in the list of assets. There are critics who maintain that these lessons are imperfectly learnt, and are of little use even if thoroughly mastered; but such statements may easily be made with reference to geography or the higher rules of arithmetic. The object is not so much to make agriculturists of our boys, as to teach them to observe intelligently what is going on daily around them, to put them in the way of seeing, thinking, and reasoning out for themselves the why and wherefore of the numerous changes and processes which form part of Nature's scheme. Prominent educationists throughout the world agree in opinion that the cultivation of the powers of observation by nature study is of invaluable aid in developing the mind and faculties of the young. What is admitted as a general principle may safely be held to apply to an agricultural colony such as ours.

Speaking in reference to the same subject at the Annual School Show, held at Tranquillity Government School, Port-of-Spain, on November 7, the Hon. S. W. Knaggs, Acting Governor of Trinidad, said:—

In an agricultural country such as this, the teaching of agriculture to the young is a matter of paramount importance, and from the neighbouring island where I have recently been serving, I have watched with very great interest the strides and advances which have been made in this colony in that direction—advances I am aware, in a very great measure, due to the personal interest taken in this scheme by the chief Inspector of Schools, Lt.-Colonel Collens. In Barbados we have the advantage of the presence and assistance of Sir Daniel Morris, the Imperial Commissioner of Agriculture, who is one of the greatest experts living on tropical agriculture. He takes the very greatest interest in any scheme for the tuition of the young in agricultural matters, and spares no pains to foster any movement in Barbados in that direction; and yet, judging from what I see this afternoon, I feel that Trinidad is but little, if at all behind-hand in the race. It is, of course, neither possible, nor perhaps expedient, that every pupil in the elementary schools of to-day, should decide to adopt the pursuit of agriculture on leaving school. But I am with Lt.-Col. Collens in this: that if the pupils in the schools take advantage of the lessons given to them in agriculture, they will (whatever their future vocation be) find that they are brought into closer touch with the great truths of Nature, and that they have acquired information and habits of observation which will be a source of pleasure to them as long as they live.



## TEA CULTIVATION IN THE UNITED STATES AND IN JAMAICA.

The résumé given below of the history of tea cultivation in the United States, is taken from *Farmers' Bulletin*, 301, recently issued by the U. S. Department of Agriculture. A note, however, has been added on tea production in Jamaica:—

A little more than one hundred years ago the French botanist Michaux successfully planted the first tea in the United States. This was at Middleton Barony, on the Ashley River, about 15 miles from Charleston, S.C.

In 1848, Dr. Junius Smith retired from an active life in London to ruralize and plant tea on his estate near Greenville, S.C. Both plants and seeds were imported, and in an article in the *American Agriculturist* for 1851, Dr. Smith stated that his plants were doing finely and had withstood a snow 8 to 9 inches deep on January 3 of that year, and he added: 'I can not help thinking that we have now demonstrated the adaptation of the tea-plant to the soil and climate of this country, and succeeded in bringing about its permanent establishment within our own borders.' Dr. Smith died soon afterwards, in 1852, and, no one being sufficiently interested in his plants to look after them, they soon disappeared.

As early as 1858, the United States Government, through the Commissioner of Patents, sent Mr. Robert Fortune to China to obtain seeds for planting in the States. In less than one year's time, tea plants were distributed among private persons in the Southern and Gulf States, who later reported that the plants had been successfully cultivated by them, and in a great many cases that tea had been made at their homes.

During the year 1880, Hon. William G. Le Duc, then Commissioner of Agriculture, employed Mr. John Jackson, who had been a tea planter for fourteen years in India, to carry on experiments, and to test the feasibility of growing and manufacturing tea in the States. The experiments were at first conducted in Liberty County, Georgia, on a place bought by the Government from Dr. Jones, who had planted tea there in 1850.

Later, 200 additional acres of land near Summerville, S.C., were leased for twenty years from Mr. Henry A. Middleton to carry on these experiments. Seed was imported from Japan, India, and China, and was also collected from the few plants then surviving in the United States from those that had been previously sent out by the Patent Office. From these seeds a small area was planted in tea, but before the plants had a chance to make very much growth, Commissioner Le Duc was succeeded by Commissioner George B. Loring, who thought it best, because of the illness of Mr. Jackson, and for other reasons, to abandon these experiments.

Since then the cultivation and manufacture of tea on a commercial scale has been practically demonstrated, in co-operation with the Bureau of Plant Industry, by Dr. Charles U. Shepherd at his 'Pinehurst' tea gardens near Summerville, S.C., where about 100 acres of land have been planted with tea, of which the area in bearing yields about 12,000 lb. of dry tea each year. One of the gardens has yielded as much as 535 lb. of dried tea to the acre during a single season.

Although the distribution of the many plants and the establishment of the many home tea gardens in the South were steps toward encouraging the people to manufacture their own tea, these gardens soon passed out of existence through lack of interest, because the important point of

teaching the growers how to pluck and make the leaves into tea had been neglected.

Dr. Shepherd's tea plantation in Southern Carolina was visited by Sir Daniel Morris in 1903. The labour was supplied by children attending a school on the estate. The tea was of excellent quality, but produced on a small scale only.

Varieties of the tea plant were introduced into Jamaica in 1868, and were planted in the public gardens on the Blue Mountains, some 4,900 feet above sea-level, where they grew well. In 1896, a plantation at Ramble in St. Ann was commenced by the Hon. H. E. Cox, and after it was demonstrated that the plant would grow there, machinery was procured, and tea prepared for market on a commercial scale, the first occasion being at the Thickets Show, in August 1903. Since that time, additional and improved machinery has been set up, and now a good class of tea is being turned out which is in considerable demand in Jamaica and elsewhere.

## JIQUE MANICOPA RUBBER.

In an article which appeared in the last number but one of the *Agricultural News* (Vol. VI, p. 333), mention was made of a rubber-producing tree known as Jiquié Manicoba, which occurs in great quantity in the Brazilian State of Bahia, but does not appear to be much known elsewhere. The rubber yielded by this tree, which is a species of *Manihot*, is stated to be of excellent quality, and fully equal to the best product of the Para region.

In the latest British *Consular Report* on the trade of Bahia, the accompanying interesting particulars are given with reference to this little known rubber tree:—

The Manicoba of Bahia is a tree which attains to a height of 30 feet and upwards, with a diameter of 2 feet when fully matured in suitable soil. It belongs to the family *Euphorbiaceae*. Its zone, so far as is at present known, extends from Maranhão to the southern borders of the State of Bahia, and it is found in greatest abundance in the regions adjoining the town of Jiquié, whence its local name.

The Jiquié Manicoba is undoubtedly a new and distinct species of *Manihot*, and it must not be confounded with the *Manihot* of Ceara (*Manihot Glaziovii*). The seeds of the Jiquié Manicoba are much larger than those of the Ceara.

The season for extracting the latex from the Jiquié Manicoba extends from August to March. The latex possesses the valuable quality of coagulating spontaneously when exposed to the air, and it requires no acid nor other artificial coagulant of any kind. It has been found, from experiment, that this tree can be made to yield its latex between the fourth and fifth years from the time of first planting: but it yields its maximum returns from the age of eight years onwards.

The planters of Bahia have awakened to the fact that in the cultivation of Jiquié Manicoba they possess a source of much potential wealth. Already several planters have begun to lay down plantations of the tree in question upon a large scale.

A planter established in the Jiquié district recently prepared a considerable quantity of rubber obtained from Manicoba trees growing wild in the neighbourhood, and despatched it to New York. The consignment was classified in the New York market as being equal to the best Para rubber, and fetched \$1.20 (5s.) per lb.



## MARKET REPORTS.

London,—November 12, 1907, 'THE WEST INDIA COMMITTEE CIRCULAR,' Messrs. KEARTON, PIPER & Co.; November 1, Messrs. E. A. DE PASS & Co.; 'THE LIVERPOOL COTTON ASSOCIATION WEEKLY CIRCULAR,' November 8, 1907.

ARROWROOT—St. Vincent, 2 $\frac{3}{4}$ d. to 3 $\frac{3}{4}$ d. per lb.  
 BALATA—Sheet, 2/1 to 2/4; block, 1/7 per lb.  
 BEES'-WAX—£7 7s. 6d. to £10 per cwt.  
 CACAO—Trinidad, 105/- to 114/- per cwt.; Grenada, 105/- to 113/- per cwt.  
 COFFEE—Santos, 28/9 per cwt.  
 COPRA—West Indian, £22 per ton.  
 COTTON—18d. to 20d. per lb.  
 FRUIT—  
 BANANAS—Jamaica, 4/6 to 5/- per bunch.  
 LIMES—3/- to 3/6 per box.  
 PINE-APPLES—St. Michael, 1/9 to 3/6 each.  
 GRAPE FRUIT—6/- to 11/- per box.  
 ORANGES—Jamaica, 5/- to 10/- per box.  
 FUSTIC—£4 5s. to £4 15s. per ton.  
 HONEY—9s. to 23s. per cwt.  
 ISINGLASS—West India lump, 1/6 to 2/2 per lb.; cake, no quotations.  
 LIME JUICE—Raw, 1/1 to 1/5 per gallon; concentrated, £21 per cask of 108 gallons; Distilled Oil, 1/11 to 2/- per lb.; hand-pressed, 4/3 to 4/6 per lb.  
 LOGWOOD—£4 5s. to £4 15s. per ton; Roots, £3 5s. to £4 5s. per ton.  
 MACE—Fair, 1s. to 1s. 3d.; pale, 1s. 4d.; broken, 10d. to 1s.; ordinary 1s. to 1s. 1d. per lb.  
 NUTMEGS—75's, 8d.; 77's, 6d.; 92's to 103's, 5 $\frac{1}{2}$ d. to 6 $\frac{1}{2}$ d.; 112's to 134's, 4 $\frac{1}{4}$ d.  
 PIMENTO—Market quiet, 3 $\frac{1}{4}$ d. per lb.  
 RUBBER—Fine hard Para, 4s. 3 $\frac{1}{4}$ d. to 4s. 4 $\frac{1}{2}$ d.; fine soft, 4s. 3 $\frac{1}{4}$ d. to 4s. 3 $\frac{1}{2}$ d. per lb.  
 RUM—Jamaica, common, 2s. 7d.; good, 2s. 10d.; fine, 3s. to 8s.; Demerara, 1s. 1d. to 1s. 2 $\frac{1}{2}$ d. per proof gallon.  
 SUGAR—Crystals, 17/6; Muscovado, 9/4 $\frac{1}{2}$ ; Molasses, 11/3 to 11/6.

New York,—November 1, 1907.—Messrs. GILLESPIE BROS. & Co.

CACAO—Caracas, 25 $\frac{1}{2}$ c. to 28c.; Grenada, 25c. to 25 $\frac{3}{4}$ c.; Trinidad, 25 $\frac{1}{4}$ c. to 25 $\frac{3}{4}$ c.; Jamaica, 24c. to 25c. per lb.  
 COCOA-NUTS—Jamaica, select, \$33.00 to \$35.00; culls, \$22.00 to \$26.00; Trinidad, \$30.00 to \$32.00; culls, no quotations.  
 COFFEE—Jamaica, ordinary, 6 $\frac{1}{2}$ c. to 7c.; good washed, 9c. per lb.  
 GINGER—Small to bold dark, 13c. to 14 $\frac{1}{4}$ c.; small to bright bold, 14 $\frac{1}{2}$ c. to 15 $\frac{1}{2}$ c. per lb.  
 GOAT SKINS—Jamaica, 52c.; Barbados, Antigua, and St. Thomas, 33c. to 50c.  
 GRAPE FRUIT—Jamaicas, \$5.25 to \$9.00 per barrel, \$3.25 to \$4.50 per box.  
 LIMES—\$3.50 to \$4.00 per barrel.  
 MACE—27c. to 32c. per lb.  
 NUTMEGS—110's, 11 $\frac{1}{2}$ c. to 11 $\frac{3}{4}$ c. per lb.  
 ORANGES—Jamaica, \$2.50 to \$3.00 per box, \$4.50 to \$5.25 per barrel.  
 PIMENTO—6c. to 6 $\frac{1}{2}$ c. per lb.  
 SUGAR—Centrifugals, 96°, 3.90c.; Muscovados, 89°, 3.40c.; Molasses, 89°, 3.05c. per lb., duty paid.

## INTER-COLONIAL MARKETS.

Barbados,—Messrs. JAMES A. LYNCH & Co., November 26, 1907; Messrs. T. S. GARRAWAY & Co., November 25, 1907.

ARROWROOT—St. Vincent, \$4.25 to \$4.50 per 100 lb.  
 CACAO—Dominica, \$17.00 to \$20.00 per 100 lb.  
 COCOA-NUTS—\$22.80 per M. for husked nuts.  
 COFFEE—Jamaica, \$8.25 to \$10.50 per 100 lb.  
 HAY—\$1.70 to \$1.80 per 100 lb.  
 MANURES—Nitrate of soda, \$62.00 to \$65.00; Ohlendorff's dissolved guano, \$55.00; Cotton manure, \$42.00; Cacao manure, \$42.00 to \$48.00; Sulphate of ammonia, \$72.00 to \$75.00; Sulphate of potash, \$67.00 per ton.  
 ONIONS—Madeira, \$1.75 to \$2.00 per 100 lb.  
 POTATOS, ENGLISH—\$3.60 to 3.64 per 160 lb.  
 PEAS—Split, \$6.00; Canada, \$3.85 per bag.  
 RICE—Demerara, \$4.50 to \$4.54 (177 to 180 lb.); Patna, \$3.65 to \$4.00; Rangoon, \$2.86 to \$3.10 per 100 lb.  
 SUGAR—48c. per 100 lb.

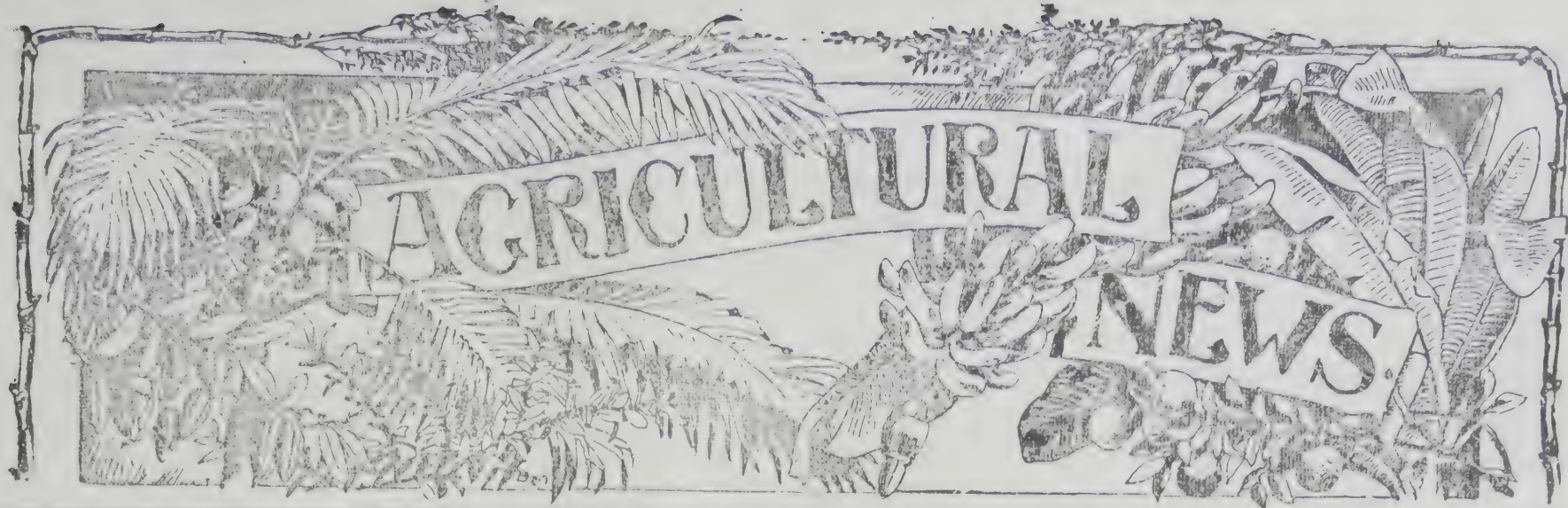
British Guiana,—November 16, 1907.—Messrs. WIETING & RICHTER.

ARROWROOT—St. Vincent, \$10.50 per barrel.  
 BALATA—Venezuela block, 32c.; Demerara sheet, 48c. per lb.  
 CACAO—Native, 20c. to 21c. per lb.  
 CASSAVA—No stock.  
 CASSAVA STARCH—\$9.00 per barrel.  
 COCOA-NUTS—\$12.00 to \$16.00 per M.  
 COFFEE—Creole, 13c.; Jamaica, 12c. per lb.  
 DHAL—\$4.30 to \$4.40 per bag of 168 lb.  
 EDDOS—\$1.44 to \$1.80 per barrel.  
 MOLASSES—18 $\frac{1}{2}$ c. per gallon.  
 ONIONS—Madeira, 2c. to 2 $\frac{1}{4}$ c.; Lisbon 2 $\frac{1}{2}$ c. per lb.  
 PLANTAINS—20c. to 60c. per bunch.  
 POTATOS,—Madeira,  $\frac{3}{4}$ c. to 1c. per lb.  
 POTATOS, SWEET—Barbados, \$1.08 per bag.  
 RICE—Ballan \$6.40 Creole, \$4.60 to \$4.75 per bag; Seeta, \$6.00 per bag.  
 SPLIT PEAS—\$7.00 per bag (210 lb.).  
 TANNIAS—\$2.88 per bag.  
 YAMS—White, \$3.00 to \$3.24; Buck, \$3.00 to \$3.24 per bag.  
 SUGAR—Dark crystals, \$2.00 to \$2.25; Yellow, \$2.80 to \$3.00; White, \$3.50 to \$3.75; Molasses, \$1.70 to \$1.90 per 100 lb. (retail).  
 TIMBER—Greenheart, 32c. to 55c. per cubic foot.  
 WALLABA SHINGLES—\$3.50 to \$5.50 per M.

Trinidad,—November 2, 1907.—Messrs. GORDON, GRANT & Co.

CACAO—\$25 to \$25.50 per fanega; Venezuelan, \$25.25 to \$25.75 per fanega.  
 COCOA-NUTS—\$23.00 per M., f.o.b.  
 COCOA-NUT OIL—85c. per Imperial gallon.  
 COFFEE—Venezuelan, 7c. to 7 $\frac{1}{2}$ c. per lb.  
 COPRA—\$3.45 to \$3.60 per 100 lb.  
 DHAL—\$4.40 to \$4.50 per 2-bushel bag.  
 ONIONS—\$2.25 to \$2.50 per 100 lb. (retail).  
 POTATOS, ENGLISH—\$2.00 to \$2.25 per 100 lb.  
 RICE—Yellow, \$5.60 to \$5.65; White, \$5.50 to \$6.55 per bag.  
 SPLIT PEAS—\$6.00 to \$6.25 per bag.  
 SUGAR—Grocery grades, \$1.60 to \$3.25 per 100 lb., according to quality.





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the tragic occurrence of January last—among tourists and other visitors from England and America.

As already announced, unexpected difficulties arose in connexion with steamship arrangements, and in accordance with the wish expressed by the Government of Jamaica, the idea of holding the Conference in that island was abandoned. It has since been arranged that the West Indian Conference of 1908 shall meet at Barbados, from January 14 to 21 next.

At the moment of writing, Barbados is under a slight cloud from the point of view of possible visitors, but in all probability, so far as can be seen at present, this will have cleared away before the middle of January, and it is hoped that a highly successful gathering will be held. Also that each Colony will find it convenient to send worthy representatives to advance the agricultural interests of the West Indies.

On account of its central position, Barbados is a highly convenient meeting-place for a gathering of the kind, and Jamaica is the only colony whose delegates might find any difficulty in attending. All other representatives can come and return in less than a fortnight—many even within eight or nine days.

In view of the very considerable amount of business to be dealt with during the week of meeting, the Agricultural Conference of 1908 promises to be of a highly interesting and important character. Probably, indeed, it will be more important than any gathering of the kind hitherto held, since in addition to the ordinary business of the Agricultural Conference, the question of reciprocal trade relations between the West Indies and Canada will occupy an important position in the programme of subjects to be discussed.

Agricultural Conference, 1908.

IN the *Agricultural News* of August 10 last, the question of the meeting-place of the next West Indian Agricultural Conference was referred to, and the proposals then in hand for holding the Conference at Jamaica were discussed. It was considered that if a successful gathering could be brought about at Jamaica this would do much to restore confidence in the island—so rudely shaken by



It may be remembered that at the Jamaica Conference of 1907, only the presidential address and two papers had been disposed of when the proceedings were broken up by the earthquake. Of the programme of business outlined in the presidential address it was possible to accomplish very little. The full set of papers that were to have been read have now, however, been published. They appear in the recently issued numbers of the *West Indian Bulletin*, (Vol. VIII, Nos. 1 to 3). These papers, it is proposed, should come up for discussion at the forthcoming Barbados meeting, together with any new information that may be available to bring them up to date.

As already mentioned, a question that will occupy a prominent place among the subjects for special attention at the Conference is that of trade relations between Canada and the West Indies. During his recent visit to Canada, the Imperial Commissioner of Agriculture was at great pains to ascertain the views of the Dominion Government and those of the leading commercial men in this matter. Since his return to the West Indies, Sir Daniel Morris has delivered several addresses, in the course of which he was able to bring forward evidence, showing that the present was a favourable opportunity for drawing Canada into closer and more extended trade intercourse with these Colonies. At the various meetings addressed by the Commissioner great willingness was exhibited to consider favourably any representations that may be forthcoming from the Dominion Government, as well as the suggestions offered by Sir Daniel in regard to the particular means by which reciprocity might be more readily brought about. The Conference to be held next month in Barbados will, therefore, afford an excellent opportunity for the various Colonies to discuss the whole question in concert, and, if some ground of agreement is reached, the results will, in all probability, tend to the advancement of the trade of these islands, and provide an assured market for their products in a progressive and prosperous community like that of Canada.

It is also proposed by the Imperial Commissioner of Agriculture, as a special feature of the forthcoming Conference, that it shall be furnished with a review of the whole of the experimental work carried on by the Imperial Department since its inception in 1898. During the past nine years, a great deal of work of this nature has been done at Barbados (under the direction of Professor d'Albuquerque and Mr. J. R. Bovell), and in Antigua and St. Kitt's (under the direction of the Hon. Francis Watts, C.M.G.), in raising new seedling canes, and in ascertaining the general manurial require-

ments of the sugar cane.

Although these experiments have not all been brought to a definite conclusion, yet a large array of facts has been accumulated which will be most valuable for the information and guidance of members of the planting community. Similar remarks apply to the experiments with cacao that have been conducted in the islands of Grenada, St. Lucia, and Dominica, under the direction of the Department, while the best methods of cultivating and marketing Sea Island cotton are of general and immediate interest.

Progress reports have been issued annually on these various lines of experimental research work, but a stage has now been arrived at when the Department is able to bring forward conclusions of considerable value to planters connected with the various industries, and also to indicate the problems to which it is thought the Department may devote attention during the coming five years, with the greatest advantage to the further development of the agricultural interests of these colonies.

Further, with regard to the experimental work carried on in British Guiana by Professor Harrison and in Jamaica by the Hon. Wm. Fawcett and the Hon. H. H. Cousins, it is hoped to be able to present a summary of results obtained in those colonies to date. Such a general résumé of the results of the activities of the past nine years in agricultural matters should, undoubtedly, be a great help in deciding the nature and direction of future work.

The various agricultural industries of the West Indies will, of course, receive individual attention, and the papers that were prepared for the Jamaica Conference will be discussed in detail, and the value of the information contained in those papers will be emphasized by the inter-exchange of views on the part of those who are practically acquainted with the several industries.

In the proceedings of the Conference, the circumstances of the sugar industry will be first discussed and, as suggested above, the long series of experiments conducted in the different colonies will come in for extended review, while the raising of 'pedigree canes' is a subject worthy of special consideration.

The cacao industry, which has been especially prominent of late on account of the high prices obtained for this product, will come next in order of importance. There are many points connected with the cultivation and preparation of cacao that should receive careful attention. Cacao planters will undoubtedly derive much useful information from



a consideration of the results of the manurial and other experiments, above referred to, that have been in progress in Grenada, Dominica, and St. Lucia; while an interchange of views as to the best methods of curing cacao by artificial or by sun heat, and the most effective means of preventing the spread of disease should be of profit to all concerned.

The lime industry, so important in Dominica and Montserrat, is attracting increased attention, and the question of lime production in British Guiana, which is reviewed on another page, is worthy of notice. The details of lime cultivation, the best methods of preparation of the various products, the relative advantages of preparing concentrated juice and citrate of lime, etc., are subjects which it is hoped will come up for discussion at the Barbados Conference.

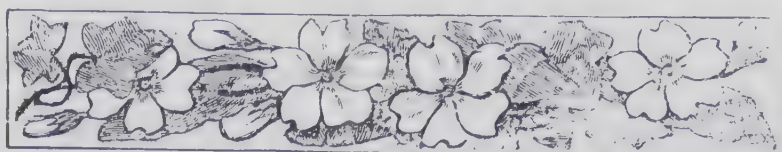
The Sea Island cotton industry, which has increased so remarkably in importance each year since it was started in 1902, will undoubtedly receive the detailed attention it deserves. Reports from the various islands as to the conditions and prospects of the present season's crops are, generally speaking, very satisfactory. Complaints have been received as to the prevalence of the cotton worm in some districts, while at Antigua and St. Kitt's, mildew and red rust have been troublesome. At Barbados and Nevis, cotton growers have suffered somewhat from want of rain.

Rubber planting is an industry of which a great deal is being heard just now. The great bulk of the world's supply of rubber is obtained from wild trees, but it is unlikely that the supply from this source will long be able to keep pace with the demand, and the prospects of rubber planting, on systematic lines, appear deserving of consideration.

As already placed on record in these pages, experiments in rubber planting, on a considerable scale, have been undertaken at Trinidad and Tobago, and similar work has been in progress for some time at Jamaica, Dominica, and St. Lucia, as well as in British Guiana, where a rubber Experiment Station has recently been started by the Government.

In addition to the above, it is hoped that time will allow of the consideration of such subjects as the fruit industry, stock breeding, agricultural education, etc. It will, therefore, be seen that a full programme of business awaits the representatives to the Agricultural Conference of 1908.

Government returns give the Barbados sugar crop of 1906 as exceeding that of the previous year by 10,766 hogsheads of sugar and 22,019 puncheons of molasses. In consequence, however, of lower prices, the value of the crop was less by £62,658 than that of 1905.



## SUGAR INDUSTRY.

### Sugar Production in the East Indies and the Brussels Convention.

With reference to the uncertain state of affairs which has lately prevailed in connexion with the maintenance of the Brussels Convention, petitions in favour of England's continued adherence to the principles that have done much among producers in the West Indies to create a considerable degree of confidence in the cane-sugar industry, have been forwarded to the Home Government not only from these colonies, but also from practically all the British sugar-producing possessions.

The cane-sugar districts of India have been especially busy in making representations and sending petitions, and documents of this nature have been forwarded to England from the Chambers of Commerce of Upper India, Bengal, Punjab, Bombay, Carachi, and Madras.

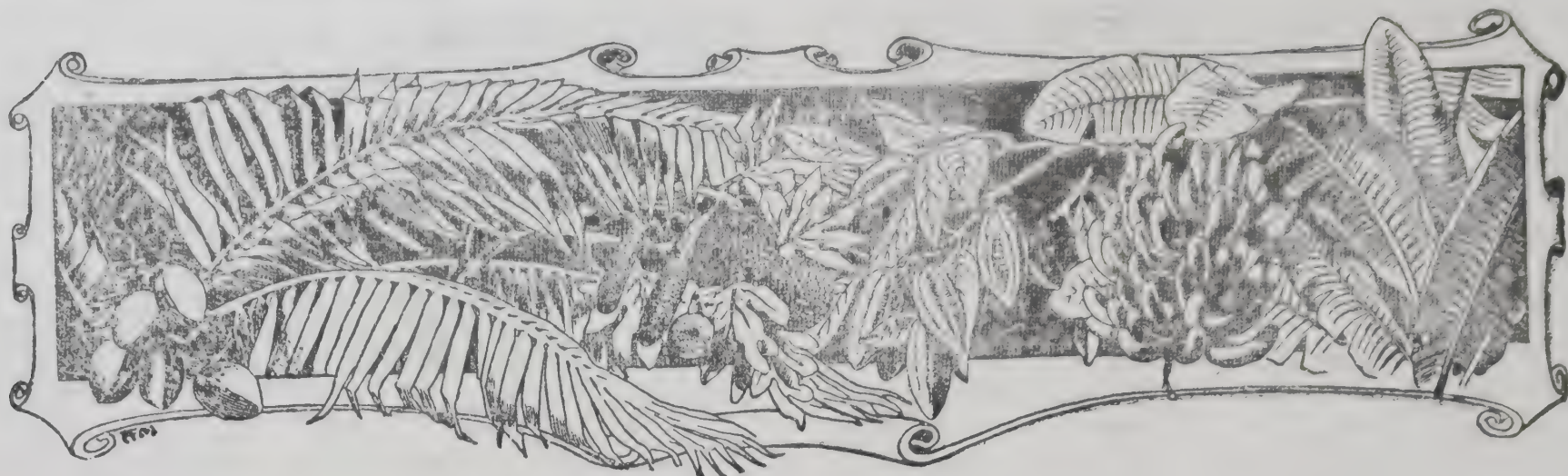
As stated in the last issue of the *Agricultural News*, very little sugar is exported from India proper, practically all that is produced being consumed at home. Notwithstanding this fact, however, the cane-sugar industry of India is of vast extent, the annual yield being about 3,000,000 tons of sugar. The English East Indies generally are among the largest sugar producers of the world, possessing enormous areas of land, well supplied with water, and eminently suitable for cane-growing. In addition, these lands have the advantage, to an extent unequalled by any others, of an abundant and cheap supply of labour, and with the possibility of an European market provided for by the continuance of the Brussels Convention, it is not unlikely that, in the near future, India may develop a considerable sugar export trade.

### Sugar in Argentina.

Drastic measures are in force in Argentina for the purpose of bolstering up the home sugar industry and of stimulating extended production within the republic.

The last sugar crop produced in the Argentine was 116,000 tons, while the annual consumption reached 140,000 tons. The extra 24,000 tons are necessarily imported, but in the interests of the home sugar manufactures a heavy import duty is levied on the foreign product. The refiners within the republic have combined to put up the price of home-grown sugar to the figure at which the heavily taxed imported article can be sold, with the result that sugar can only be obtained in Argentina at the rate of 1s. 2d. per lb. Another indication of the artificial state of affairs which exists is the fact that the home manufacturers are only able to carry on their business by means of capital borrowed at high rates of interest. Consumers are naturally very discontented at the present state of affairs, but it would seem that either the home sugar producers possess undue influence with reference to legislation, or that those responsible for this protective policy have great faith in the sugar-producing possibility of the Argentine. At the present rate of increase of the sugar area, it is stated that twenty years must necessarily elapse before the republic produces all the sugar needed for home consumption.





## WEST INDIAN FRUIT.

### BRITISH WEST INDIES AND FRENCH BANANA MARKET.

Referring to the two new steamers of the French Compagnie Generale Transatlantique, the *Guadeloupe* and the *Perou*, the former of which covered the distance between Bordeaux and Martinique in 8 days 23 hours on her maiden voyage, and, as mentioned in the *Agricultural News* (Vol VI, p. 360), took a shipment of Trinidad bananas to France on her return, the *Voice of St. Lucia* points out the great opportunity thus offered to the fruit growers of that island, of developing an export trade in bananas, etc., from St. Lucia to France. In its issue of November 14 last, the *Voice* says:—

Not the least interesting of the fittings of the 'Guadeloupe' is the refrigerating space set aside for the storage of fruit, for which ample provision is made all over the vessel, this moreover obviating the necessity of making ice on board.

It might not be impossible for producers in St. Lucia to negotiate with the Cie. Generale to carry fruit from St. Lucia as it now carries cacao, rum, logwood, pimento sticks and other of our products. The British and American fruit markets are being worked up energetically by some of our neighbours, but we are debarred from competing with them (for the present, at any rate) by want of suitable means of transport. Therefore, why not make every effort to build up a business for ourselves, for which the means seem ready to hand?

France offers an almost untried field for bananas and other tropical fruit, and through France may be tapped the larger and still less hitherto tried markets of continental Europe.

### LIME INDUSTRY IN BRITISH GUIANA.

It will be remembered that at the beginning of 1907 a syndicate of British capitalists obtained a grant of 1,500 acres of land in British Guiana, at Agatash, on the Essequibo river, for the purpose of establishing a lime industry.

This corporation has recently sent out Mr. F. W. Bolton, a planter who has had considerable experience in the tropics, to take charge of the enterprise, and the *Demerara Daily Chronicle* makes this appointment the opportunity for publishing an article discussing the prospects of the lime industry in the colony.

Everyone concerned is agreed that the land selected is admirably adapted for growing limes, but up to the present even the preliminary clearing operations have not been

completed, and consequently, a considerable time must elapse before any return can be obtained from this area.

It is pointed out, however, that although, so far, little systematic attention has been paid to lime growing in British Guiana, yet the colony possesses considerable latent resources in this way, as large numbers of lime trees exist which have received little care since they were planted, and which at present flourish in practically a wild state.

As suggested in the *Chronicle*, these neglected resources might be organized and developed, and made to form the starting-point of a lime industry in the colony before the plantation at Agatash reaches the fruit-bearing stage. Lime culture may be taken up by planters on a large scale, and it must also be regarded as an industry which promises well for smaller agriculturists. The prices of concentrated lime juice and citrate of lime, as well as of other lime products, have recently increased, and as far as can be gathered, these advanced prices are likely to be permanent. Growers in British Guiana appear to be ignorant of the possibilities of lime culture, as this only would explain the lack of care and attention given to the trees already in existence. Mr. Bolton is reported as being anxious to assist in organizing these neglected resources, and to do all he can to promote a lime industry in British Guiana.

It is stated that, even under present conditions, a considerable quantity of limes could be placed on the market if all the available produce were collected, although it would hardly appear that any given district at present produces sufficient fruit to warrant erection of a plant in the neighbourhood for the expression of the juice. The first thing to be done is to guarantee a continuous and reliable supply of limes—even though this supply at first be small in quantity; and, with the representative of an enterprising syndicate, interested in the development of the industry, at hand, no doubt need be entertained as to the existence of a remunerative market, or the establishment of working plants in various districts, as occasion arose. Lime culture, and the preparation of lime juice and citrate of lime, etc., have become industries of first importance in Dominica and Montserrat, and there is no reason why similar success should not attend intelligent efforts to bring about the same state of affairs in British Guiana.

The shipments of preserved pine-apples from the Bahamas during 1906-7 (117,396 cases) were almost double the exports of the previous year. The Board of Agriculture of the colony has made a special grant of £100 to assist in cultural and manurial experiments with the pine-apple crop. (*Annual Report*, 1906-7.)



## DEMAND FOR GROUND NUTS.

In connexion with the frequent references to the cultivation of ground nuts (otherwise known as pea nuts, monkey nuts, etc.) that have been made in the *Agricultural News*, the following extract from the report of the Natal representative at the recent South African Products Exhibition in London, indicating the demand which exists for this product, is worthy of note:—

Inquiries were more frequent in regard to ground nuts than in regard to perhaps any other product, their use for the extraction of oil having apparently assumed large proportions. The inquiries were constantly for nuts of large size in preference to small ones.

## COCOA-NUTS AND VANILLA IN THE SEYCHELLES.

Cocoa-nuts and their products, and vanilla form by far the most important items among the agricultural exports from the Seychelles Islands, the value of the products of the cocoa-nut palm exported last year reaching 432,474 rupees (about £29,800), while vanilla was exported to the value of 101,818 rupees (about £7,450). The details given below, of the conditions and prospects of the two industries, are taken from the *Report on the colony for 1906*:—

The total weight of cocoa-nut exports is approximately 2,050 tons. The shipments of copra (900 tons) have trebled since 1905, owing to a rapid increase in value, the bulk of the export going to Marseilles. There is a corresponding decrease in the quantity of oil exported, which has fallen to 360 tons, the lowest figure on record. One-half the oil exported goes to Madagascar, and the rest is sent to Mauritius, Bombay and neighbouring ports.

The production of soap, 360 tons, has continued steadily to expand, the principal markets being Zanzibar and Madagascar, where the product has established a strong position in the face of European competition: it is probable, however, that the production will be curtailed so long as the quotations for copra remain at their present favourable figure. The number of cocoa-nuts exported to Mauritius and Aden is much reduced, owing to the high prices obtained in the local market for manufacture into copra. The quantity of desiccated cocoa-nuts is included in the figures for copra. There is no industry in the production of coir rope or fibre. Poonac, a by-product of cocoa-nut oil, is consumed locally in large quantities for feeding to stock, though it is not exported.

During the past year an additional 400 acres have been planted with cocoa-nut palms, so that the total area under this crop now reaches 9,000 acres.

The report on the vanilla crop is not so encouraging, as will be seen from the particulars given below.

The vanilla crop of 1906 was the lowest since 1895. The actual exports in the year amount to 17,118 kilograms, (1 kilogram equals 2·2 lb.), but this total includes over 7,000 kilos, of the crop of 1905, exported during the earlier months of 1906.

Of the harvest in 1906, less than 10,000 kilos. were exported during the year, and local stocks are absolutely depleted. The price in January was 7s. 5½d. per kilo., as compared with 11s. 10d. in January, 1905; but prices rapidly improved towards the end of the year, and the average quotation of last December was 11s. 5d. per kilo. The mean

declared value of vanilla for the whole year was 8s. 2d. per kilo.

Vanilla is essentially a poor man's crop, as it needs little capital to produce, and the cultivation even on the larger estates is worked to a great extent on the share system. The failure, therefore, of this crop last year meant a severe blow to the creole peasantry, for they had little compensation in the high prices which were obtained for cocoa-nuts.

The crop of 1907 will, granted fair weather, prove satisfactory in quantity, although the quality may be below the average. It is probable that the crop will reach 50,000 kilos.

## CULTIVATION OF THE CASTOR OIL PLANT.

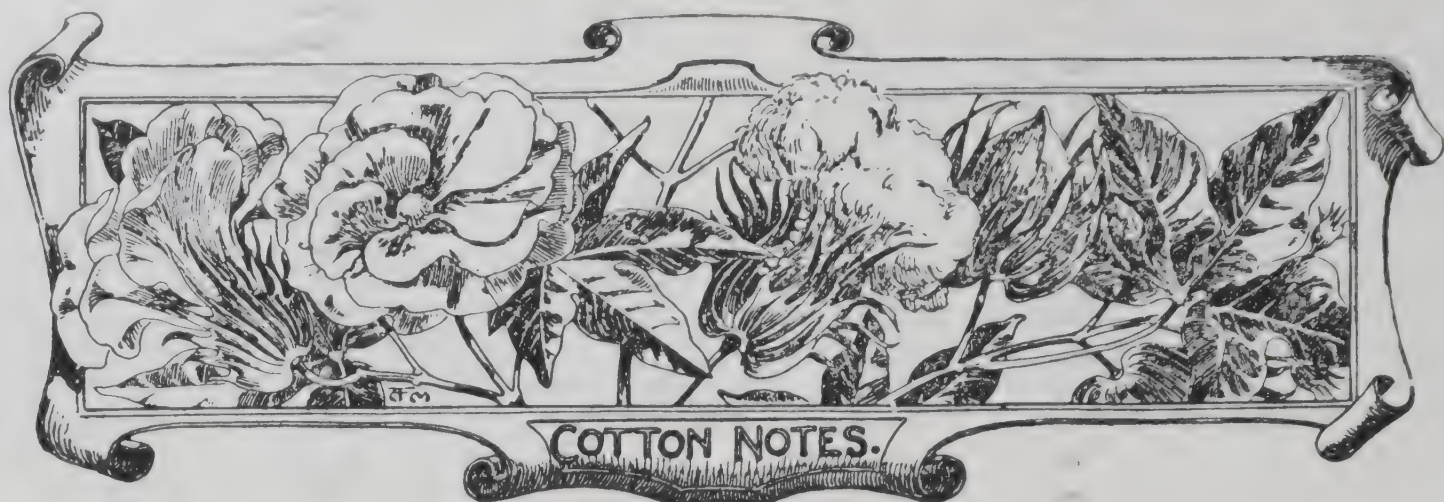
Apart from its employment in medicine, castor oil is now in considerable demand for various uses in the arts and industries. It is employed in connexion with dyeing and printing cotton goods, in the manufacture of soap, in the dressing of leathers, and also largely for illuminating and lubricating purposes in some countries. It was stated in a recent number of the *Transvaal Agricultural Journal* that as much as 66,000 gallons of castor oil were annually required for lubricating purposes by the Central South African Railways, and that another 124,000 gallons are utilized every year by the Cape Government Railways Department. In an article in the *Agricultural Journal of the Cape of Good Hope* it is pointed out that 4,000 acres of land are required to yield this amount of castor oil, and that there is no reason why it should not be produced in the South African Colonies, as there is plenty of land available which would not grow more paying crops.

The castor oil plant likes alluvial soils, and good loams. They must be warm and well-drained. Warm and dry climatic conditions are also required. The land to be sown must be well and deeply tilled, as the plant has a large-spreading root-system. About 10 lbs. of seed to the acre is required. Before sowing, the seeds should be steeped for 24 hours in hot water. They are then planted out in rows about 6 feet apart, the hills, or spots where the seeds are set being from 4 to 6 feet apart in the rows. From two to four seeds are planted to each hill. When the seeds have germinated, however, and the young plants reached a height of from 6 to 10 inches, all but the most vigorous seedling at each hill are removed. Subsequent cultivation is the same as in the case of cotton, corn, or tobacco.

The plants should begin to bear in four months, and will continue to do so for two months. Thus six months is required from the sowing of the seed to the preparation for the harvest.

As soon as the pods or capsules of seeds are seen to be turning brown, it is time they were gathered. If left longer, they burst, shedding the beans in all directions, and entailing serious loss. The spikes bearing the capsules are therefore cut and allowed to dry in a shed, or on a clean, enclosed piece of ground. They must be protected from rain. Here they remain, being turned occasionally, until the beans have all shelled themselves; they are then winnowed to get rid of the husk. The beans must on no account be allowed to get wet.





### WEST INDIAN COTTON.

Messrs. Wolstenholme & Holland, of Liverpool, write as follows, under date of November 25, with reference to the sales of West Indian Sea Island cotton:—

Since our last report about 100 bales of West Indian Sea Island have been sold. These consist of undesirable lots remaining over from last crop, the majority being more or less stained. Prices range between 6*d.* and 18*d.*

A few bales of new crop Barbados have also been sold at 21*d.*, and the future course of prices largely depends upon the action of the holders of American Sea Island, irrespective of Florida and Georgia, the crop of which is about 12,000 bales.

Had it not been for the low quality of this season's Florida crop, prices of West Indian would have opened considerably lower.

We are hoping that prices will continue to be maintained during the marketing of the West Indian crop.

There is little or no inquiry for West Indian over 20*d.* to 21*d.* for best.

We think that medium qualities of West Indian should rule about 18*d.* to 19*d.* this season.

### SEA ISLAND COTTON IN GEORGIA.

Speaking of the weather experienced during cotton picking in Georgia, and of the condition of the crop, Messrs. W. W. Gordon & Co., of Savannah, reported on October 25 last:—

The weather during the past week was warm and clear, and favourable for picking. The quality of the receipts was unusually poor, both in grade and in staple. The cotton arriving showed the effects of the heavy rains of two weeks ago. Even recent pickings are dull, and lack the bloom which the early receipts usually possess. Inability to secure pickers has compelled planters to leave their cotton open in the fields, where the dew has fallen on it and dulled the colour.

The demand for bright cotton continues, but on a small scale, and transactions are practically nominal, because of extreme scarcity of the grade required.

Their report of November 8 states:—

The weather continued clear and favourable for harvesting the crop. The quality of the receipts continued very poor, both in staple and in preparation. Considering the number of clear days which have prevailed during this picking season, it is difficult to find an explanation for the low grade of the crop.

During the past week there was a demand for brilliant bales at high prices, but the quality required was very scarce. A large business was done at 24*c.*, the grade purchased being what might be called Scant Fancy or Extra Choice to Fancy.

Genuine Extra Choice cotton was neglected. Choice cotton was sold at 21*c.*, a full style of extra Fine at 20*c.*, and Fine at 19*c.* At these prices liberal sales were made, and the offering of stock was correspondingly reduced.

On November 15 Messrs. Gordon write:—

The weather during the past week was cold and clear. Heavy frosts were experienced, which checked the further growth of the plant. There was a good demand throughout the week, principally for Extra Choice cotton, on a basis of 22½*c.* Fancy and Extra Fancy were also bought, but the irregularity of the grade caused buyers to reject heavily, and made business generally unsatisfactory.

### OBJECTS OF COTTON SEED SELECTION.

Since the subject of seed selection has been so frequently referred to of late in the *Agricultural News*, it may be well to enumerate the objects of this important operation:—

- (1) To maintain uniformity in the quality of the cotton produced.
- (2) To increase yields by producing a heavier bearing plant, and one which matures all its bolls.
- (3) To produce plants with a disease-resisting power.
- (4) To produce a plant which yields a minimum quantity of weak fibre; hence, one which gives a stronger and a less wasty cotton.
- (5) To increase the quality of the cotton as regards fineness and length.
- (6) To produce a plant adapted for the conditions of the district in which it is being developed.

### SHEDDING OF COTTON BOLLS.

Up to the present time the cotton plant has been subject to a number of pests which have been a source of great expense to the planter, both in the loss of cotton sustained, and in consequence of the money spent on Paris green and other agents to keep them in check. As it would naturally be expected, those pests which consume the leaves and other parts of the plants, are very readily observed and their ill effects recognized, but very few cotton planters ever realize the great loss caused by the shedding of forms, flowers and cotton bolls.

During an unfavourable year, the shedding of bolls is found to be much more prevalent than during a normal season; but during any season young buds and bolls can be found on the ground underneath the plants. Shedding of bolls is a subject which has been very largely discussed by various writers on cotton cultivation; and usually the conclusion drawn is, that the cause of it is a purely physiological one.



As far as can be observed, the amount of available food material within the plant has a very important bearing on the number of bolls which are formed, and afterwards shed, or brought to maturity. It has been found that when the roots are pruned by deep cultivation, a large number of the buds and young bolls fall to the ground. When the surface soil is allowed to become hard and caked, and covered with weeds, the plant has again a great tendency to shed an abnormal number of bolls. If anything occurs to stimulate the plant to produce an excessive amount of vegetable growth at the time when the bolls are quickly forming, it is also noticed that they begin to fall rapidly from the plant.

Again, during heavy rains, when the soil becomes sodden and the plant is unable to absorb food elements, the young bolls are shed. A spell of very dry weather, when the plants find it difficult to obtain a sufficient amount of moisture, has the same effect. The shedding of the bolls from the lower branches is also very marked when the plants are crowded together, and often the only cotton that can be obtained from the crowded fields is from the tops of the plants: and it has been observed that plants in very exposed places never hold their bolls so well as those which are protected from the breezes.

The question how to prevent the bolls from being shed, is one of very great importance, and should receive very careful consideration. It must be borne in mind, that at the time when the plant is rapidly forming its bolls, it is in a most critical condition, and slight variations in its environment are apt to be reflected in the plant adjusting itself to the new conditions. It may happen that the conditions which prevail during the early part of the plant's growth are most favourable, and it sets out to produce a large crop of fruits; but later, unfavourable conditions set in, and the plant not being able to mature all the fruits it had started to produce, a re-adjustment takes place, and a large number of the bolls are shed.

In order to make it possible for the plant to mature a maximum number of bolls, it must be given every facility for obtaining a sufficient amount of moisture and food elements from the soil, and for light and air to pass to every part of the plant. In the first place, the land must be well prepared, and if need be, a supply of manure should be given. The plants should be properly spaced, overcrowding must not be allowed under any consideration, and this should be followed up with constant and careful surface cultivation; the ground should never be allowed to become caked, and weeds must not be tolerated.

The horse cultivator lends itself well to the cotton cultivation; by its means cultivation can be confined to a very limited depth, and as is said by an authority on cotton cultivation: 'Once a week, and once to the row with a good horse cultivator' is an excellent rule.' By thus keeping the surface always broken and mellow, the soil moisture is prevented from evaporating. It is impossible for the planter to alter climatic conditions. He must take whatever comes; but with good preparation, drainage, and surface cultivation, he is in a better position to meet unfavourable conditions whenever they should come upon him.

It is very probable that seed selection will be of great service to cotton planters in this direction. As far as can be observed, the individual plants vary in their ability to mature the bolls which they commence to form, some plants shedding much more than others. Here is a chance for the seed-selecting planter: if this character of maturing practically all the bolls which are started is transmitted to the offspring, then the seed from a plant which is especially remarkable for the large proportion of bolls brought to

maturity may prove to be of very great value indeed.

Those who are undertaking cotton seed selection would do well to bear this in mind when making a selection of plants in the field.

## THE COLONIAL BANK AND COTTON GROWING IN THE WEST INDIES.

The report of the proceedings at a General Meeting of the Proprietors of the Colonial Bank, held in London on October 9 last, has recently been issued. The Chairman (Mr. Harry Hankey Dobree) referred to the remarkable growth of the new Sea Island cotton industry in the West Indies as follows:—

Cotton is becoming an important item in the produce of the West Indies, especially in the smaller islands, and I should like to read you a few passages from a letter written by Sir Daniel Morris, the Imperial Commissioner of Agriculture for the West Indies, to the Secretary of State for the Colonies. He says: 'Owing to enhanced prices consequent on the falling off of supplies from the United States, the exports during the half-year ended June 30, 1907, have already reached an estimated value of £154,976, while the total value of the cotton exported from the West Indies during five and a half years to June 30, 1907, amounts to £315,241.' This, you will understand, is quite a new industry in the West Indies. 'If, however, the value of the seed is added to the value of the lint, the exports during the last half-year reach an estimated value of £167,664, while the total value of the lint and seed exported during the five and a half years amounts to £374,486.' The letter continues: 'As far as can be seen at present, there is no reason why the West Indies should not continue to improve the quality of the seed produced locally, and thus become independent of supplies from other countries. The general prospects of the West Indian Sea Island cotton industry are therefore of a distinctly promising character, and there is every probability that the value of the exports in future years will steadily increase.' I might remind you that Sir Daniel Morris is the head of that department which was instituted by Mr. Chamberlain when he was at the Colonial Office, and I think we owe Mr. Chamberlain a great debt of gratitude for all he did on that score. The West Indies are also greatly indebted to the British Cotton-growing Association, which has fostered the industry from the beginning. In 1902—the first year that cotton planting was encouraged in the West Indies—the total value of lint and seed exported was £9,600. For the half-year ended June 30 last, the total value was £167,600. This is an industry which gives great employment to the labourers in the smaller islands. It is not anticipated by Sir Daniel Morris, or, I believe, by others, that it will be of great value in the larger colonies such as Trinidad, Jamaica, and Demerara, but in Barbados and the smaller islands it is likely to prove a very valuable adjunct to the trade of the West Indies.

The Central American rubber (*Castilloa elastica*) is reported as growing fairly well, though rather slowly, in the mountain districts of Grenada. Unfortunately it is stated to be susceptible to attack by a white mealy bug and the attendant root fungus, but it is thought that the adoption of spraying methods during the early stages of growth of the trees, will preserve them from damage from this source. Young plants of the *Funtumia elastica* variety are described as doing well and growing rapidly in the island.



## EDITORIAL NOTICES.

Letters and matter for publication, as well as all specimens for naming, should be addressed to the Commissioner, Imperial Department of Agriculture, Barbados.

All applications for Copies of the 'Agricultural News' should be addressed to the Agents, and not to the Department.

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# Agricultural News

VOL. VI. SATURDAY, DECEMBER 14, 1907. No. 147.

## NOTES AND COMMENTS.

### Contents of Present Issue.

The programme of the West Indian Agricultural Conference, to be held in Barbados from January 14 to 21 next, is discussed in the editorial.

On p. 388 a brief review appears of the possibilities of the lime industry in British Guiana.

Particulars as to the condition of the Sea Island cotton markets are given on p. 390, followed by an interesting article dealing with the causes of shedding of bolls, and means that may be adopted to prevent, as far as possible, this loss of crop.

A successful peasants' agricultural show was held at Barbados on December 4 (p. 393).

A summary of the first part of an instructive paper 'The Study of Insects'—recently delivered in Barbados by the Entomologist of the Imperial Department of Agriculture—appears under Insect Notes (p. 394).

Details as to the enormous increase of the cacao outputs from St. Thomé are given on p. 395, and on the same page a brief article discusses the possibility of cacao cultivation in the Virgin Islands.

Poultry keepers should be interested in the results of a laying competition, full particulars of which are given on page 398.

### Immigration into British Guiana.

It is apparent, from a consideration of the report, for 1906-7, of the Immigration Agent-General of British Guiana, that the extension of the area devoted to rice cultivation is a disturbing factor as regards the labour supply of the colony. British Guiana has frequently made efforts to obtain agricultural settlers from the West Indian Islands; these attempts, however, have not been attended with much success, and indentured labour has, therefore, had to be obtained from India.

The sugar planters to whom these labourers are indentured have, under past conditions, borne the expense of immigration, etc., which they have been willing to do, since the probability was that, at the expiration of the term of indenture, they would still be able to retain a sufficient number of the immigrants to carry on the work of the estate.

With the rapid extension of rice growing, however, and the introduction of other industries suitable for small settlers, the conditions of the colony have somewhat changed. The East Indian coolie is well acquainted with the conditions of rice culture, and at the end of his term of engagement the natural inclination is for him to acquire a small homestead and plot of land of his own, and to set about growing rice.

Under these conditions, it is unlikely that Demerara sugar planters will, in future, be able or willing to bear the cost of immigration, since the chances are that the East Indian labourers will be leaving just when they have become most useful.

### Natural and Synthetic Indigo.

The falling off in the production of natural indigo in India is very apparent on consideration of the area devoted to the cultivation of the plant in that country. In 1904-5, the indigo area was 755,900 acres. This fell in 1905-6 to 330,400 acres, or less than 44 per cent. of the previous year's area, while in 1906-7 there was a further drop to 329,800 acres.

On the other hand, the production of synthetic indigo is reported as advancing by leaps and bounds. In 1906, synthetic indigo was imported into England to the extent of 39,042 cwt. compared with 7,641 cwt. of natural indigo.

Commenting on these figures at a recent meeting of the London Society of Chemical Industry, the Chairman pointed out that in order to hold their own on the market, planters must learn to improve their methods both biologically and chemically—biologically by improving the content of the plant, as beet growers had improved the sugar content of the beet, and chemically by the adoption of better methods of preparation of the indigo, so as to make its quality constant.

It would seem, however, as the result of experiments carried out under the auspices of the Behar Planters' Association, and referred to in a previous number of this journal, that materials dyed with synthetic indigo have not the rich 'bloom' or finish characteristic of cloth dyed with natural indigo. If further experience establishes this as an undoubted fact, natural indigo will always find a place on the market.



### Grape Culture in Jamaica.

The possibilities of grape production in Jamaica have frequently been referred to in the agricultural journals of that island, and various notes on the culture of this fruit have appeared in past numbers of the *Agricultural News*. The October number of the *Journal of the Jamaica Agricultural Society* contains a brief article on the subject, from which it would appear, however, that little systematic attention is given to the cultivation and production of grapes, even in those districts of Jamaica where it has been demonstrated that the crop can be raised successfully. The grape-vine flourishes in low-lying situations near the sea, and will do well and produce fruit up to elevations of 1,200 feet or so. It should be planted with a south or south-east aspect, but the great requisite in grape culture is a thorough understanding of the processes of pruning the vines and of thinning out the young bunches of fruit. Annual pruning back to old wood is always essential in grape production, since the fruit is borne on the new season's growth. The proper time for pruning in Jamaica is between the end of January and the middle of March. As regards good varieties to grow, the Muscat of Alexandria is a tried favourite, and the Muscat Hamburg and Barbarossa have also given good results in Jamaica. These do not require much thinning out of fruits, while with the Gros Colman and some others, some 60 per cent. of the set berries should be removed.

Foster's White seedling has been recommended as a good early-producing variety, while the Alicante grape may be selected when a late ripener is desired. Since the *Journal* referred to mentions some of the poorest districts of Jamaica as being the most suitable for grape production, it would be a considerable step towards the improvement of the conditions existing in those districts if some systematic efforts were made to extend a cultivation which is bound to be one of profit to those undertaking it.

### Agricultural Show at Barbados.

The Barbados annual Peasants' show of agricultural produce and live stock, held under the auspices of the Imperial Department of Agriculture, took place at Applewhaites plantation, St. Thomas', on Wednesday, December 4.

Applewhaites plantation was an excellent locality for the show, and Mr. G. C. Edghill, the Attorney, did everything in his power to assist in the success of the gathering. There was plenty of room and every convenience for displaying the exhibits, which formed a very creditable collection of produce, the fruit and vegetable sections being especially noticeable for their variety and good quality.

Fruit, indeed, may be said to have been the chief feature of the Show, the exhibits consisting of plantains, bananas of various kinds, shaddocks, grape fruit, oranges, mandarins, tangerines, golden apples, papaws, musk melons, water melons, and avocado pears. Specimens of mangosteen sent by Dr. Nicholls of Dominica were also shown by Sir Daniel Morris.

Although rather early in the season, the exhibits in

the vegetable classes were distinctly good. The ground provisions were of excellent quality, while the garden vegetables, consisting of carrots, turnips, cabbages, tomatoes, cucumbers, squash, christophines, fresh peppers, varieties of beans, etc. showed evidence of having been carefully grown. The attractive manner in which many of these exhibits were presented was also worthy of note.

The live stock and poultry classes were not so well filled as usual, but the poultry exhibits were of good quality. Very few entries, too, were received in the classes in which prizes were offered for the best working donkey and cart, and for the best milch cow.

Two fine animals, the property of the Imperial Department of Agriculture, the Punjab ram goat 'Rajah' and also one of the West African ram sheep, recently imported from Lagos, were on view at the exhibition. The services of these animals should be of special value to peasant proprietors in improving their local breeds of goats and sheep.

As many as 122 entries were made in the class for exhibits from elementary schools. The diploma of Merit was won by Society School, St. John's.

In class IV prizes were offered to small growers for the best exhibits of not less than 10 lb. of Sea Island cotton. In addition to the money prizes the successful competitors were presented with beautiful handkerchiefs made of Barbados cotton.

Diplomas of merit of the Imperial Department of Agriculture were offered for the best exhibits of collections of ground provisions, corn, crates of bananas and onions, as well as for the best stool of sugar-cane, and sample of Sea Island cotton sent in by large cultivators.

Among the visitors to the Show were Sir Gilbert and Lady Carter, Lady Morris, and Sir Bickham Sweet-Escott, K.C.M.G., Governor of the Leeward Islands. The Hon. F. J. Clarke, C.M.G., President of the Agricultural Society, was also present and acted as one of the Judges.

At the distribution of prizes, his Excellency Sir Gilbert Carter made a short speech, expressing the pleasure it gave him to attend, and his belief in the good work done by these agricultural shows.

Sir Daniel Morris, afterwards spoke, and said that the good results of the shows were apparent in the improved quality of the exhibits shown this year as compared with those of previous years. He urged the peasant proprietors present to take a still greater interest in their gardens, and the kind of crops that might be grown, as well as to do their best to improve the quality of those crops. Small live stock, too, would pay for increased care and attention being given to them.

Sir Daniel Morris then referred to Sea Island cotton cultivation and pointed out that it requires constant care and attention, but that a good return may be expected.

In concluding his speech the Imperial Commissioner referred to the valuable services of Mr. J. R. Bovell who had done so much to bring about the success of the Show. The proceedings came to a close by three hearty cheers for Mr. Cobham (the owner of Applewhaites) and for Mr. Edghill (the Attorney).





## INSECT NOTES.

### The Study of Insects.

Below is given an abstract of the first part of a lecture delivered at the Carnegie Library in Barbados, on Wednesday December 4, by Mr. H. A. Ballou, M.Sc., Entomologist on the Staff of the Imperial Department of Agriculture. The abstract of the concluding portion will appear in the next issue of the *Agricultural News*.

In the introduction to the lecture it was stated that it was intended to bring before the audience, for brief survey, the class of the animal kingdom to which insects belong, and to point out some of the ways in which they are both interesting and important.

Insects were referred to as the most numerous class of the animal kingdom. At present, about 300,000 species of insects are known to science, and it is estimated that there are at least, 1,000,000 species in existence. According to this estimation, the insect species comprise about four-fifths of the total number of species in the animal kingdom. In size, insects occupy an intermediate position; the smallest are smaller than the largest protozoans, and the largest larger than the smallest vertebrates.

As instances of some of the larger insects, several West Indian forms were mentioned, such as the Hercules beetle (*Dynastes hercules*), guava lobster (*Diapherodes gigantea*), and some of the hawk moths. Some of the species of small insects were also referred to: *Trichogramma pretiosa* is a parasite on the eggs of the moth borer of the cane, and the cotton worm, and probably others. The red maggot of the cotton (*Porrichondyla gossypii*) is another small insect.

Referring to a chart on which were given the divisions of the animal kingdom, it was shown that insects are grouped in the sub-division which also contains the Crustacea—as lobsters, cray-fish and crabs; Myriapods—centipedes or forty-legs; and the Arachnida—as mites, ticks, scorpions, and spiders.

Insects are distinguished from these nearly related forms by the following characters: the body is divided into three regions—head, thorax, abdomen. There are normally in the adult three pairs of legs and two pairs of wings. Breathing is accomplished by means of 'tracheae.' Insects are divided into orders according to their relationship.

The study of insects dates back to ancient time. Aristotle, (384 to 325 B.C.) was a naturalist, and made observations of the honey bee, and described the transformations of the butterfly. Malpighi and Swammerdam were great naturalists in the latter part of the 17th century, and may be said to have begun the modern study of insects.

The presidential address of Professor Garman before the American Association of Economic Entomologists at New Orleans in 1906, was referred to in connexion with the amount of published information dealing with insects. To describe properly the adults alone of the existing species of insects, would require 2,000 octavo volumes of 500 pages each. To describe the life-histories, and to relate the habits and distribution of each species, would require at least another 5,000 volumes; including with the insects the related Myriapods

and Arachnids with which entomologists often have to deal, it would require a library of not less than 7,000 volumes to give merely the important facts concerning existing species, not including discussions of remedies for insect injuries. Professor Garman also stated that about sixteen volumes, containing some 8,000 pages of special literature relating to insects, are produced each year.

The characteristic features in the structure of insects were mentioned, as being of interest, and as having a bearing on the relationship and classification of this group. It was shown that the head of insects has, as appendages, one pair of antennae, and mouth parts formed either for biting, sucking, or lapping. The thorax has two sets of locomotive appendages, three pairs of legs, and two pairs of wings, while the abdomen in the adult insect is without locomotive appendages.

The skeleton of insects is external, and is composed of a special substance called 'chitin'. This external skeleton has processes extending into the body cavity to which muscles are attached. The circulation is accomplished by means of a dorsal vessel. The nervous system is composed of ganglia, and is ventral in its location. The digestive system is central. Respiration is carried on by means of tracheae, which are tubular in structure, ramifying through all parts of the body cavity, and which are bathed by the body fluids, that are thus aerated.

The metamorphosis of insects may be either complete or incomplete. The term is used to include those post-embryonic changes through which insects pass in becoming adults. Complete metamorphosis includes four distinct stages—egg, larva, pupa, and imago or adult. In the complete metamorphosis, the newly hatched insect is different in form from the adult. In the incomplete metamorphosis the young resembles the adult in shape, but is of course without wings. The incomplete metamorphosis includes three stages—egg, larva or nymph, and adult.

In speaking of insects in their relation to agriculture, the lecturer showed that they have for the past century been considered as coming most intimately into the affairs of men, and the discoveries of the last few years have shown that insects play a very important part in the dissemination of certain diseases. It has been estimated that the loss to agriculturists in the United States alone from insects, has reached the enormous figure of \$500,000,000 in a single year. Among the more important pests is the chinch bug, which during one year in one State, caused injury amounting to \$3,000,000. In one period of fifteen years, the cotton worm was responsible for a loss amounting to \$15,000,000. Other very important pests mentioned were the 'codlin' moth, Colorado potato beetle, boll worm, boll weevil, and gipsy moth. The boll weevil has been the cause of a loss to the cotton crop, estimated as high as \$30,000,000 in a year, and has led to the establishing of a scientific Commission for the investigation of its life-history, its habits, and the nature of its injuries.

In the West Indies, the cotton worm, the moth borer of the cane, and a long list of scale insects are well-known pests which prey upon agricultural crops; and cockroaches, moths, weevils, etc., are equally well known as household pests; while the termites or white ants attack the woodwork of buildings, bridges, and even living trees.

A very important result of the study of insects has been the discovery of the relation of host and parasite, and the application of this knowledge in practical affairs. The control of the fluted scale in California, by the Australian ladybird, is an illustration of the remarkable success which may attend the application of scientific knowledge to a practical problems.



## CACAO INDUSTRY OF ST. THOME.

The cacao industry of St. Thomé has of late years developed so rapidly that this small island is now one of the most valuable of the Portuguese possessions. Referring to the production of cacao in St. Thomé, the United States Consul at the Madeira Islands writes in his recent *Report* :—

The cacao crop of the whole world is estimated to be 2,300,000 bags of 130 lb. each, and of this amount the small island of St. Thomé, with only an approximate area of 355 square miles—not more than one-third of which is in actual cultivation—supplies 450,000 bags, or about one-fifth of the total, a harvest worth to them over \$8,000,000 annually. Statistics show the growing importance of this island as a producing centre. The crop of 1897 was 141,663 bags of 130 lb. each; in 1900, 220,149 bags; in 1905, 425,196 bags; and in 1906, 407,452 bags.

The trees begin to bear after five or six years, but they do not attain maturity of productiveness until they are ten years old, after which they continue to give their fruit for about forty years. If one considers these initial difficulties, it seems remarkable that St. Thomé has been able to more than double her output of cacao in so short a period, and looking into the future (assuming the maintenance of present prices), it may not be an exaggeration to say that the present production will be again redoubled in the next ten years, since there is much more land available there for the cultivation of the cacao tree than is now in actual plantation; and there is, as might be expected, great activity in soil clearing and crop extension.

A casual study of the cacao markets of the world would seem to further justify this prophecy. The present demand for cacao can scarcely be satisfied, and according to late returns from London, buyers are taking deliveries more freely than ever before. This is not from the fact that there is any special shortage of supply, but simply because there is such an eager competition to secure orders for delivery that prices are keeping higher than conditions really justify. There seems no doubt from this and other indications, that if there was a large supply there would be a correspondingly larger consumption. The total available deposits of cacao to cover the demand during the non-productive months decrease annually, seeming to represent a growing excess of consumption over the visible production.

## CACAO IN THE VIRGIN ISLANDS.

Although up to the present very little cacao has been produced in the Virgin Islands, and it has been asserted that the climate is too dry for the cultivation of this crop, yet it would appear, from the favourable results that have attended the cultivation on an experimental scale at the Botanic Station, that, with proper attention, a cacao industry might be established in those islands.

In 1902, the first experiments with cacao plants were made at the station at Tortola, when plants were set out between bananas on the leeward side of a belt of bush. They received very little attention beyond a slight application of pen manure. In 1905 these plants were reported as being in a promising state, and as bearing several pods each. Previous to this, it was pointed out by Dr. Watts, who was on a visit to the Virgin Islands, and who noticed the promising character of the cacao experiment plots, that the cultivation of this crop, if taken up by the peasant proprietors of the

islands, would in all probability prove to be an industry of considerable profit. No machinery is required, and there should be no difficulty as regards labour.

The cacao experiment plots at the station have continued to thrive, and there has been considerable demand for plants among small proprietors.

Rather more than a year ago, Mr. Fishlock, the Agricultural Instructor at Tortola, sent a small sample of cacao, produced in the island, and cured and fermented at the station, to the Imperial Commissioner of Agriculture. This was forwarded to brokers in London, who returned an encouraging report on the sample.

At the commencement of November last, another letter in connexion with cacao production in Tortola was received by the Imperial Commissioner of Agriculture from Mr. Fishlock. The latter states that he purchased a quantity of cacao in the pod from peasant growers in Tortola, the fermentation and curing of which were undertaken by himself at the Experiment Station. The beans were kept in the fermenting box for about eight or nine days, and on being taken out were washed before being put through the drying process. Drying was affected somewhat slowly on wooden trays. The cacao was then shipped to Messrs. Kearton, Piper & Co., of London, who reported on the sample to Mr. Fishlock as follows :—

Your two boxes of cacao arrived here on September 27. Although of rather different cure, they were well fermented and carefully cured, and show exceedingly intelligent care in the preparation. We have effected a sale at 113s. per cwt., usual landed terms. Had the parcel been larger, it would have realized even a higher figure.

The variety of cacao grown at the Botanic Station is the Forastero, but plants of the Calabash variety are also grown in Tortola. Although the fruits of this latter kind are smaller than those of the Forastero, the plants are hardier, and the produce may make up in quantity what it lacks in quality.

The above particulars are of considerable interest, as indicating that cacao of at least fair quality can be produced in Tortola.

## MILLIONS.

Specimens of the small fish occurring in streams in Barbados, known locally as millions, or 'thousands', and which consume the larvae of mosquitos in large quantities, were recently forwarded by the Imperial Commissioner of Agriculture to the Director of the British Museum for identification. These specimens were from several localities, and it was hoped to learn whether more than one species existed in Barbados, and whether the name given by a correspondent (see *Agricultural News*, Vol. IV, p. 366) was correct.

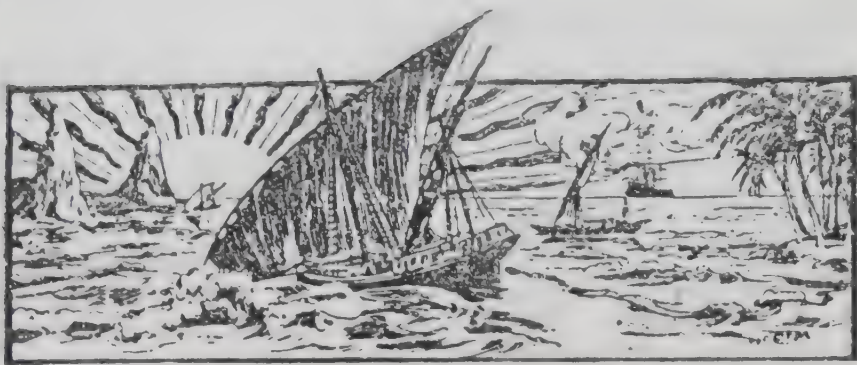
The correspondent referred to stated that the fish were closely allied to, if not identical with, a species named *Girardinus versicolor*.

The following letter on the subject has been received from Mr. G. A. Boulenger, F.R.S., of the British Museum :—

The correct name of the little Cyprinodont fish from Barbados sent by the Commissioner is *Girardinus pocciloides*, De Filippi, 1862. *G. versicolor*, Guntner, 1866, is probably a synonym, but further material from the original locality (San Domingo) would be required to settle the question.

I am not aware of any other species of this group being found in Barbados.





## GLEANINGS.

The *Annual Report*, 1906-7, on the Leeward Islands mentions the fact that onion growing is now an established minor industry in Antigua, and to a smaller degree in Montserrat. The crop has also been successfully grown in Nevis and St. Kitt's.

The average rainfall from 189 stations in Barbados during 1906-7 is given as 70.70 inches, as compared with 54.59 inches from 197 stations for the previous year, and with 62.48 inches, from an average of 115 stations, the mean of the past sixty years. (*Annual Report*, 1906-7.)

Fruit growers in British Honduras are reported to have had a very good season. Cocoa-nuts and bananas have done especially well, the former commanding \$23 per thousand. (*Belize Clarion*.)

The U.S. Consul at Georgetown mentions in his latest report that there are forty-five sugar estates in British Guiana which together comprise 70,000 acres in area, representing an average of about 1,560 acres each.

The 'Lady Kensington' recently conveyed 6 tons of whales' bones, locally produced, from St. Vincent to Trinidad. This was bought up in the latter island at \$11 per ton, and will be converted into manure. (*St. Vincent Sentry*, November 22.)

While in 1905 the average consumption of sugar per head in the German Empire was 33 lb., it increased to 44 lb. in 1906. Owing, however, to the abundant beet sugar crop in the latter year, the price paid for raw cane sugar by the refineries was only 16s. as compared with £1 10s. 2d. in 1905.

A correspondent at Trinidad writes: Strangely enough, the European product Molassine has a large sale here, but there is no molascuit to be obtained. It seems that the charge is considered too high, although reports state that it is selling in fair quantities in Demerara.

Excellent rice-growing lands exist along the banks of most of the rivers in British Honduras, and small plots of rice of the highest quality are grown by natives. The methods of preparation of the grain, however, are very crude. Efforts are afoot to extend the rice industry and to introduce improved methods, and, considering the large amount of this product imported into the colony at present, these efforts should be attended with success.

The *Voice of St. Lucia* suggests that efforts should be made by planters in the island to bring about an export trade in bananas with Denmark, since the steamers of the East Asiatic Company, which are provided with cold storage capacity, regularly call at the island.

In connexion with the experiments in Sea Island cotton growing that have been conducted at Grenada, it is believed that sowing the seed at the end of August, or the beginning of September will give the best results, as the crop will then be ready for picking in January, which is usually a dry month.

Messrs. Henry W. Frost & Co., of Charleston, reporting on the Sea Island cotton market, under date November 16, state that the supply of cotton is at present unequal to the demand. The quantity received from the islands during the week reached 705 bales, which sold readily at prices averaging from 17½d. to 20½d. per lb.

The largest sugar refinery in the world under one roof is situated at Hong Kong. This is capable of turning out 800 tons of refined sugar per day of twenty-four hours. The factory gives employment to 2,500 Chinese workmen and 48 Europeans, and is fitted with all the latest machinery. (*British Consular Report*, 1907.)

The labour situation in the Hawaiian Islands has been more satisfactory this year. The opposition to yellow labour that has been put forward in the United States and Canada has had a great deal to do with this, since labourers who would otherwise have emigrated to those countries have gone no farther than Hawaii, and those already in Hawaii have deemed it advisable to remain. (*Sugar Cane*, November.)

It may interest those in St. Lucia who are thinking of taking up the culture of Sea Island cotton, to know that an area of 1½ acres planted with this crop, and recently flowering, can be seen at the Experiment Station, Union. The Agricultural Superintendent (Mr. J. C. Moore) invites inspection, and will be pleased to furnish information relating to the cultivation of cotton.

The quantity of teak exported from Siam during 1906 was 96,837 tons, having a value of £819,647. With the exception of the output of 1905, this constitutes a record for all previous years, and is a very considerable advance on the average for the past five years. The rice exported from Siam, too, exceeds the average of the past five years by no less than 170,753 tons.

The question of the importation of an Ayrshire bull, of good milking strain, is being considered by the St. Lucia Agricultural Department. This animal would be stationed at the Agricultural School, Union, and it is suggested that a fee of 3s. should be charged for his services. A good bull of this world-famed dairy breed should bring about a considerable improvement in the milk-producing capacity of the native cows of the island.

The experiment cultivation of tobacco is still in progress in St. Kitt's. The *Annual Report* on the Leeward Islands, 1906-7 states that the results so far obtained have been promising, and point to the possibility of the eventual establishment of a cigar tobacco industry in the island.





*GRENADA: ANNUAL REPORTS ON BOTANIC STATION AND AGRICULTURAL INSTRUCTION, 1906-7.*

A brief history of the Botanic Station, since the selection of the site in 1886, appears at the commencement of this report on the work of the year.

Following this, is given a summary of the efforts made by the Imperial Department of Agriculture to assist the agricultural industries of Grenada since the Botanic Station was placed under the supervision of the Imperial Commissioner, in 1898. Useful information has been disseminated by means of classes for youths, held by the Curator at the Botanic Station, by lectures—one series of which was given to school teachers, while others have been delivered in country districts, and open to all classes; by demonstration meetings, and also through the medium of the publications of the Imperial Department. The advice and services of the officers at headquarters have also been at the disposal of planters in connexion with insect and fungoid pests attacking their crops.

Experiment plots for the cultivation of cacao, manured and cultivated at the expense of the Imperial Department, have been taken up on various peasant holdings, and these plots have been made the centres of demonstration meetings and informal lectures by the Agricultural Instructor. Similar experimental work, but on a larger scale, is now in progress on a number of estates.

The claims of other crops, such as rubber, citrus fruits, cotton, etc., the cultivation of which may become valuable subsidiary industries to cacao culture in Grenada, have been advanced by the Department, and each year these crops are receiving more attention from planters.

Other means by which the Imperial Department of Agriculture has sought to assist both planters and peasant proprietors, have been the provision of the services of pedigree animals for the improvement of the live stock of the island, and the interest taken in, and assistance afforded to, the local Agricultural Shows.

During the past year the receipts for the sale of plants, seeds, fruit, etc., amounted to £42 12s. 10d. It is reported that there was a large demand for the seeds of both *Hevea brasiliensis* and *Castilloa elastica*, which indicates the increasing interest taken in rubber planting. Plants of cacao, Arabian coffee, banana, Saman, and bamboo make up the great bulk of the economic plants sold, while 4,850 plants of seedling cane D. 95 were also disposed of in the island.

The report gives particulars of the year's progress with the work of the experiment plots of cacao, coffee, fruit, corn, yams, etc. at the station. Trees in the orchard have been badly infested with black blight, but these trees have been kept lime-washed and sprayed, a method of treatment which has lately been adopted by many outside growers. Cacao trees are stated to have suffered much from drought during the past year.

In July 1906, three experiment plots of Sea Island cotton were established at Mount Rodney, Point Saline, and the Botanic Station respectively. The season was not favour-

able for good results, the most satisfactory return being obtained from the Point Saline plot, where a yield of 750 lb. of seed-cotton was picked per acre.

Details are given of the manurial trials with cacao that are in progress on a large scale on many estates. These experiment stations are under the control of the Department, but the planters themselves bear the expense.

The prize-holdings competition to encourage the improvement of cacao cultivation among the peasantry, instituted a year ago on the suggestion of the Imperial Commissioner of Agriculture, who gave a grant of £25 for prizes, has met with great success, there being twenty-five entries.

The report of the Agricultural Instructor contains particulars of the work done in visiting estates, peasant holdings, cacao experiment plots, and the experiment stations. Advice and assistance have been given to cultivators of all classes, especially in connexion with such matters as the burial of cacao shells, etc., pruning, tarring of wounds, and methods of manuring. Improved methods of curing cacao beans have been demonstrated to the peasants, with the result that they have been able to place a better-priced product on the market.

Tables are attached to the Instructor's report giving details of the manurial treatment on the several experiment plots together with the yield of produce obtained. With the exception of the plot at the Botanic Station, which suffered severely from drought during the past year, it is satisfactory to note that there are considerable increases in the yields, compared with those of 1905-6.

*BRITISH HONDURAS: REPORT ON BOTANIC STATION, 1906.* By E. J. F. Campbell, F.R.H.S., Superintendent.

A new Botanic Station, covering an area of about 20 acres, is being prepared on a site near Belize. At the time of writing the report, however, the operation of clearing the ground from bush, etc., was not completed. It is believed that this new area will answer every requirement of a Botanic Station and experiment ground, and will also offer opportunity for the establishment of a school garden.

Up to the present the Belize Garden has formed the chief Botanic Station of the colony, while subsidiary nurseries exist at Stan Creek and Corosal. Logwood plants were grown in large numbers at the Belize Garden during 1906, but all of them were sold, as many as 7,500 plants being disposed of during the year. Nutmegs for distribution were raised from a supply of seeds sent from Trinidad. It is mentioned also that a large bed of tomatos was set out in December, and as there is a considerable local demand for this fruit, the cultivation at the Botanic Station may encourage production within the colony.

The nursery at Stan Creek was established especially for the raising of young plants, cacao in particular, to which the soil and situation are well adapted. The demand for plants from the nursery, however, is reported as having fallen off of late. The Para rubber trees at Stan Creek are reported to be doing well, and during the past year a good crop of Liberian coffee was collected, the vanilla yielded a very satisfactory crop of beans, and fruits were borne by nearly all the cacao trees.

At the Corosal nursery, *Castilloa* and *Funtumia* rubber trees are being tried, and demonstration plots also exist for the experimental cultivation of corn, cabbages, tomatos, English peas, mangos, etc.

The total number of plants distributed during the year reached 9,655—chiefly logwood and cacao. The receipts from the sales totalled \$337.55.



## POULTRY NOTES.

### Best Laying Varieties of Hens.

Below is set out a record of the laying performances—during a period of twelve months—of a considerable number of breeds of fowls tested in a competition conducted at the Hawkesbury Agricultural College, New South Wales.

The results achieved by the representatives of several of the breeds must be described as very good, although there is nothing extraordinary in the number of eggs laid by the hens of the prize-winning pen, since in several competitions, cases have occurred where hens have laid over 200 eggs per annum. Most poultry keepers, however, will be bound to admit that these figures, though not sensational, represent a rate of production much above the average yield per head obtained from their own flocks, which are, in all probability, composed of hens of several breeds and of all ages, running together.

There are several breeds of fowls, more especially the Mediterranean varieties, such as the Andalusian, the Minorca, and the Leghorn, which may be described generally as good laying varieties, and it may be pointed out that, within the limits of these varieties, laying capacity is more a question of strain than of breed. A poultry keeper therefore, who wishes to level up the character of his fowls, should be at pains to select one or two good laying hens of the above varieties, and mate them only with a cock known to be the offspring of a hen of good laying capacity. If this process of selection is repeated with the offspring of these birds, and only the best layers retained and allowed to breed, a considerable increase in the receipts from the poultry yard should soon be apparent. To obtain the best results, however, hens should not be retained as layers after reaching the age of two years, when they may advantageously be killed for the table, and replaced by younger birds.

It will be observed that the place of honour in the competition of which particulars are given below, was taken by a pen of 'Cuckoo Leghorns.' This is merely a sub-variety of the well-known Leghorn breed, the chief distinction being that the birds have cuckoo-coloured (blue and white) plumage. They are also, as a rule, somewhat smaller than other varieties of the Leghorn.

The number of eggs produced per hen, and the value of the produce are set out herewith:—

Breed.	Eggs per hen.	Value per hen. s. d.
6 Cuckoo Leghorns — — —	190·16	16 10½
18 Langshans — — —	188·88	16 10
120 Black Orpingtons — — —	178·41	15 8½
30 Brown Leghorns — — —	177·00	14 10
138 White Leghorns — — —	174·93	14 8¾
12 Golden Wyandottes — — —	171·33	15 5
126 Silver Wyandottes — — —	170·51	15 1½
24 Minorcas — — —	168·91	14 0
6 Rhode Island Reds — — —	166·66	14 2
6 Partridge Wyandottes — — —	164·16	13 7½
12 Buff Wyandottes — — —	163·75	14 10
18 Buff Leghorns — — —	160·55	14 0
18 Buff Orpingtons — — —	150·11	14 1
24 White Wyandottes — — —	146·70	12 7½
6 Black Leghorns — — —	138·33	10 0
6 Houdans — — —	137·33	10 3
3 Faverolles — — —	126·66	9 10

## MEXICAN COFFEE.

Discussing the industrial conditions and prospects of the Southern Mexican State of Michoacan, the United States Consul at Mexico City reports that this is a province of great natural resources, but that development is delayed by lack of railway communication. The accompanying note from the Consul's report with reference to the coffee cultivation in the State is of interest:—

Some attention is given to general agriculture around Uruapam. The most important industry, however, is the cultivation of coffee, which is beginning to attract attention in the markets because of its excellent quality. It has been put forward as a rival of Arabian Mocha. Its excellence is most probably due to the limited production and more intensive cultivation, together with certain probable favourable conditions of soil and climate.

While there has been a small quantity exported to the United States, the greater part of the crop is consumed in Mexico. The present annual production has been estimated at 15,000 to 18,000 arrobas (375,000 to 450,000 lb.). The small crop is due to the fact that the cultivation of the coffee is restricted to the small farms on the outskirts of the town. As the demand is greater than the supply, the crop is usually purchased before maturity. Private advice is to the effect that the reigning price on May 31 for the grade of coffee denominated caracolillo, said to be best, varied from \$4·50 to \$5·00 (United States currency) per arroba (11½ kilos.), and that of ancho, a cheaper grade, from \$2·50 to \$3·00.

## PHENOMENAL RAINFALL.

In a paper read before the Royal Meteorological Society some months ago, it was stated that a rainfall of no less than 41 inches was experienced during a period of thirteen hours at Suva, Fiji, on August 8, 1906. This was referred to in a note in the *Agricultural News* (Vol. VI, p. 172), where it was suggested that this fall constituted a record.

The Hon. W. H. Porter, Treasurer of Dominica, writing to the Imperial Commissioner of Agriculture, points out, however, that the disastrous flood experienced at Basseterre, St. Kitt's, in January 1880, was caused by a rainfall which, according to all accounts, must have surpassed the fall in Fiji above referred to.

In this connexion, Mr. F. R. Shepherd, Agricultural Superintendent, St. Kitt's, sends the following information:—

On page 65 of a pamphlet entitled 'Hurricanes,' issued by the United States Department of Agriculture (being Bulletin 32 of the Weather Bureau Department), an account is given of the flood that occurred at Basseterre in 1880. This pamphlet states: 'Of course all gauges and marks by which the amount of the precipitation could be measured were either swept away or entirely submerged, and only individual opinions can be had on this point. The following note on the point occurs in Mr. George James Evelyn's Journal:—"It is supposed that 36 inches fell during the time from 12 o'clock (midnight) and 3 a.m. on January 13. Town was flooded, immense damage done to houses; many persons lost and missing." There are some, however, who would estimate the fall at no more than 23 inches. It was this heavy fall in the town, augmented by the overflowing of the mountain streams, which caused the great havoc in Basseterre.'



## WEST INDIAN PRODUCTS.

### Drugs and Spices on the London Market.

Mr. J. R. Jackson, A.L.S., has forwarded the following report on the London drug and spice market during the month of October :—

The markets in spices and drugs during the month of October passed off from week to week with comparatively little change from our last report. The chief interest of the month was the drop in the price of camphor, both English and German refined being reduced by 3*d.* and 2½*d.* respectively. In this connexion there is no doubt that the recent high prices which have ruled in this article, have had the effect of diminishing the consumption, and so given encouragement to the development of the trade in synthetic camphor, which can now be obtained regularly in London at lower rates than the English refined article. An editorial note on the subject in the *Pharmaceutical Journal*, the official organ of the Pharmaceutical Society of Great Britain, says: 'samples of synthetic camphor which have been examined by us, respond to all chemical tests of natural camphor, and for industrial purposes, there is no difference between the two products. The following are the chief notes of interest affecting West Indian products.

#### GINGER.

No Jamaica was offered at the first sale on October 2, but 164 bags of Cochin and Calicut were brought forward and bought in, small rough washed Cochin sold at 38*s.* per cwt. A week later there was again no Jamaica offered, and 2 packages only were sold, of 330 offered, of Cochin and Calicut. The following are the prices at which the respective kinds were bought in: Small cut Calicut in cases, 52*s.* 6*d.*; medium cut, 72*s.* 6*d.*; unsorted native cut, 55*s.*; washed rough Cochin, slightly wormy, 40*s.* On the 16th, there was still no Jamaica on sale, and a very small sale was effected in Cochin, some 200 bags of fair washed rough being bought in at 36*s.* per cwt. On the 23rd, there was again no Jamaica, and the other sales were unimportant. At the last sale on the 30th, 2 barrels of ordinary Jamaica were disposed of at 75*s.* per cwt., while 360 bags of Cochin and Calicut were bought in, the latter at 36*s.* for small washed rough. Some brown rough African was also bought in at the same price.

#### NUTMEGS, MACE, AND PIMENTO.

At the first spice auction on the 2nd, 30 packages of West Indian mace were offered and realized from 1*s.* 3*d.* to 1*s.* 4*d.* for fair; 1*s.* 1*d.* to 1*s.* 2*d.* for ordinary; 11½*d.* to 1*s.* for common red; and 8½*d.* to 11½*d.* for broken. Fair curly Java realized at the same sale 1*s.* 3*d.*; and red curly 11*d.* On the 16th, 24 cases of Singapore were disposed of at 1*s.* 2*d.* for ordinary red, and 1*s.* 1*d.* for palish. Ordinary dull Penang was sold without reserve at 1*s.* 3*d.* to 1*s.* 4*d.* At the concluding sale on the 30th, West Indian mace was in good supply and sold at the following rates: Good pale, 1*s.* 5*d.* to 1*s.* 7*d.*; ordinary, 1*s.* 1*d.* to 1*s.* 3*d.*, and broken, 8½*d.* to 1*s.* 1*d.* For nutmegs there has been a steady demand. At the first auction on the 2nd of the month, some 123 packages of West Indian were disposed of at slightly advanced rates on previous prices. A week later, the large supply of 560 packages of West Indian were offered and sold at similar prices. On the 16th, there was no change, the offerings amounting to 90 packages of Singapore, 20 packages of Penang, and 18 packages of West Indian.

On the 23rd, there was a drop in the prices, 90 packages of Singapore selling without reserve at 8*d.* to 8½*d.* Thirty

packages of West Indian were also sold at similar rates. At the last auction on the 30th, the large number of 500 packages, chiefly West Indian, were offered, and the bulk sold at somewhat irregular rates. Little or nothing was done in Pimento in the early part of the month; at the second auction, there was a steady sale at 3½*d.*, which varied but slightly during the remainder of the month.

#### ARROWROOT.

The quotation for good manufacturing St. Vincent at the first sale in the month stood at 2¼*d.* to 2¾*d.*, at which price 140 barrels of the same quality were disposed of. On the 23rd, 100 barrels of the same quality were offered and 20 sold at 2¾*d.* No change occurred after that date.

#### SARSAPARILLA.

At the drug sale on the 10th, genuine grey Jamaica secured firm prices. For 3 bales of fair, part slightly chumpy, 1*s.* 8*d.* per lb. was paid, and 1*s.* 9*d.* for 2 other bales; for fair Lima-Jamaica 1*s.* 6*d.* was paid; and for part coarse and chumpy, 1*s.* 5*d.*; pale dullish red sold at 1*s.* 1*d.*, and mixed dull was bought in at 1*s.* 2*d.* A fortnight later, 11 bales of native Jamaica were offered and disposed of at the following rates: fair to good bright red, 1*s.* 1*d.*, dull red, 1*s.*; and ordinary dull, 10*d.* per lb. No grey Jamaica was offered. No further reports have been made upon this drug since the above.

#### KOLA, LIME JUICE, OIL OF LIME, ETC.

Of Kola, on the 9th of the month, 2 boxes of green West Indian were sold without reserve at 2½*d.* per lb. On the 23rd, some 54 packages from Grenada and Jamaica were offered and sold at 2¼*d.* to 2¾*d.* for fair bold, and 1*s.* 2*d.* per lb. for low green Jamaica. On the 30th, a further consignment of 37 packages of West Indian was disposed of, dry realizing 2*d.* to 3*d.*, and green 3½*d.* per lb. Forty-six bags of Ceylon were also sold at this auction at 2½*d.* to 2¾*d.* per lb. for dry. In the early part of the month the quotation for West Indian lime juice was 1*s.* 5*d.* per gallon, at which price 11 hogsheads of partly good pale raw were bought in at the auction on the 9th. At this sale also, 6 cases of West Indian distilled oil of lime were sold at 2*s.* 7*d.* per lb. On the 23rd, the prices had slightly advanced to 2*s.* 7*d.* to 2*s.* 8*d.* One case of oil of bay from Montserrat was offered and disposed of at this sale at 7*s.* 9*d.* per lb.

## RUBBER IN MEXICO.

The Soconusco district of Mexico is reported to be excellently adapted for *Castilloa* rubber production, and great activity is at present being displayed in developing its resources in this direction. The British Vice-Consul at Soconusco has the accompanying note in his last Annual Report :—

Rubber is having quite a boom. There are several large plantations opened up here already, and clearing is going on now for planting up new ones this year. The native tree, *Castilloa elastica*, is what is being planted up, and the soil, climate, etc., seem to be exactly suitable. These plantations belong principally to American companies. Tapping will probably begin this year on the older plantations, when some accurate idea may be formed of the production. Rubber has not been cultivated before in these parts on an extensive scale, and the results are being carefully watched by all interested in this cultivation.



## MARKET REPORTS.

London,—November 26 1907, 'THE WEST INDIA COMMITTEE CIRCULAR,' Messrs. KEARTON, PIPER & Co.; November 15, Messrs. E. A. DE PASS & Co.; 'THE LIVERPOOL COTTON ASSOCIATION WEEKLY CIRCULAR,' November 22, 1907.

ARROWROOT—St. Vincent,  $2\frac{3}{4}d.$  to  $3\frac{1}{4}d.$  per lb.  
 BALATA Sheet,  $2\frac{1}{4}$ ; block,  $1\frac{1}{7}$  per lb.  
 BEES'-WAX—£7 7s. 6d. to £7 10s. per cwt.  
 CACAO—Trinidad, 105/- to 114/- per cwt.; Grenada, 105/- to 113/- per cwt.  
 COFFEE—Santos, 28/9 per cwt.  
 COPRA—West Indian, £22 per ton.  
 COTTON—18d. to 20d. per lb.  
 FRUIT—  
 BANANAS—Jamaica, 4/6 to 5/- per bunch.  
 LIMES— $3\frac{1}{4}$  to  $3\frac{1}{6}$  per box.  
 PINE-APPLES—St. Michael, 1/9 to  $3\frac{1}{6}$  each.  
 GRAPE FRUIT—6/- to 11/- per box.  
 ORANGES—Jamaica, 5/- to 10/- per box.  
 FUSTIC—£4 5s. to £4 15s. per ton.  
 HONEY—18s. to 22s. per cwt.  
 ISINGLASS—West India lump, 2/- to 2/2 per lb.; cake, no quotations.  
 LIME JUICE—Raw, 1/1 to 1/5 per gallon; concentrated, £21 per cask of 108 gallons; Distilled Oil, 1/11 to 2/- per lb.; hand-pressed, 4/3 to 4/6 per lb.  
 LOGWOOD—£4 5s. to £4 15s. per ton; Roots, no quotation.  
 MACE—Fair, 1s. to 1s. 3d.; pale, 1s. 4d.; broken, 10d. to 1s.; ordinary, 1s. to 1s. 1d. per lb.  
 NUTMEGS—75's, 8d.; 77's, 6d.; 92's to 103's,  $5\frac{1}{2}d.$  to  $6\frac{1}{2}d.$ ; 112's to 134's,  $4\frac{3}{4}d.$   
 PIMENTO—Market quiet,  $3\frac{1}{4}d.$  per lb.  
 RUBBER—Fine hard Para, 4s.  $3\frac{1}{4}d.$  to 4s.  $4\frac{1}{2}d.$ ; fine soft, 4s.  $3\frac{1}{4}d.$  to 4s.  $3\frac{1}{2}d.$  per lb.  
 RUM—Jamaica, common, 2s. 7d.; good, 2s. 10d.; fine, 3s. to 8s.; Demerara, 1s. 1d. to 1s.  $2\frac{1}{2}d.$  per proof gallon.  
 SUGAR—Crystals, 17/6; Muscovado, 9/4½; Molasses, 11/3 to 11/6.

New York,—November 15, 1907.—Messrs. GILLESPIE BROS. & Co.

CACAO—Caracas, 24c. to 27c.; Grenada, 24c. to  $24\frac{1}{2}c.$ ; Trinidad,  $23\frac{3}{4}c.$ ; Jamaica, 24c. to 25c. per lb.  
 COCOA-NUTS—Jamaica, select, \$34.00 to \$36.00; culls, \$23.00 to \$27.00; Trinidad, \$32.00 to \$33.00; culls, no quotations.  
 COFFEE—Jamaica, ordinary,  $6\frac{1}{2}c.$  to 7c.; good washed, 11c. per lb.  
 GINGER—Small to bold dark,  $12\frac{1}{2}c.$  to 14c.; small to bright bold,  $14\frac{1}{2}c.$  to  $15\frac{1}{2}c.$  per lb.  
 GOAT SKINS—Jamaica, 52c.; Barbados, Antigua, and St. Thomas, 33c. to 50c.  
 GRAPE FRUIT—Jamaicas, \$3.00 to \$4.50 per barrel, \$2.00 to \$2.50 per box.  
 LIMES—no quotation.  
 MACE—28c. to 33c. per lb.  
 NUTMEGS—110's,  $9\frac{1}{4}c.$  to 11c. per lb.  
 ORANGES—Jamaica, \$2.25 to \$3.00 per barrel, \$1.25 to \$2.00 per box.  
 PIMENTO—6c. to  $6\frac{1}{2}c.$  per lb.  
 SUGAR—Centrifugals, 96°, 3.90c.; Muscovados, 89°, 3.40c.; Molasses, 89°, 3.05c. per lb., duty paid.

## INTER-COLONIAL MARKETS.

Barbados,—Messrs. JAMES A. LYNCH & Co., December 10, 1907; Messrs. T. S. GARRAWAY & Co., December 9, 1907; Messrs. LEACOCK & Co., November 30, 1907.

ARROWROOT—St. Vincent, \$4.25 to \$4.50 per 100 lb.  
 CACAO—Dominica, \$17.00 to \$20.00 per 100 lb.  
 COCOA-NUTS—\$12.50 to \$18 per M. for husked nuts.  
 COFFEE—Jamaica, \$8.25 to \$10.50 per 100 lb.  
 HAY—\$1.80 per 100 lb.  
 MANURES—Nitrate of soda, \$62.00 to \$65.00; Ohlendorff's dissolved guano, \$55.00; Cotton manure, \$42.00; Cacao manure, \$42.00 to \$48.00; Sulphate of ammonia, \$72.00 to \$75.00; Sulphate of potash, \$67.00 per ton.  
 ONIONS—Madeira, \$1.75 to \$2.00 per 100 lb.  
 POTATOS, ENGLISH—\$1.76 to \$2.10 per 160 lb.  
 PEAS—Split, \$6.00; Canada, \$3.85 per bag.  
 RICE—Demerara, \$4.50 to \$4.54 (177 to 180 lb.); Patna, \$3.65 to \$4.00; Rangoon, \$2.86 to \$3.10 per 100 lb.  
 SUGAR—48c. per 100 lb.

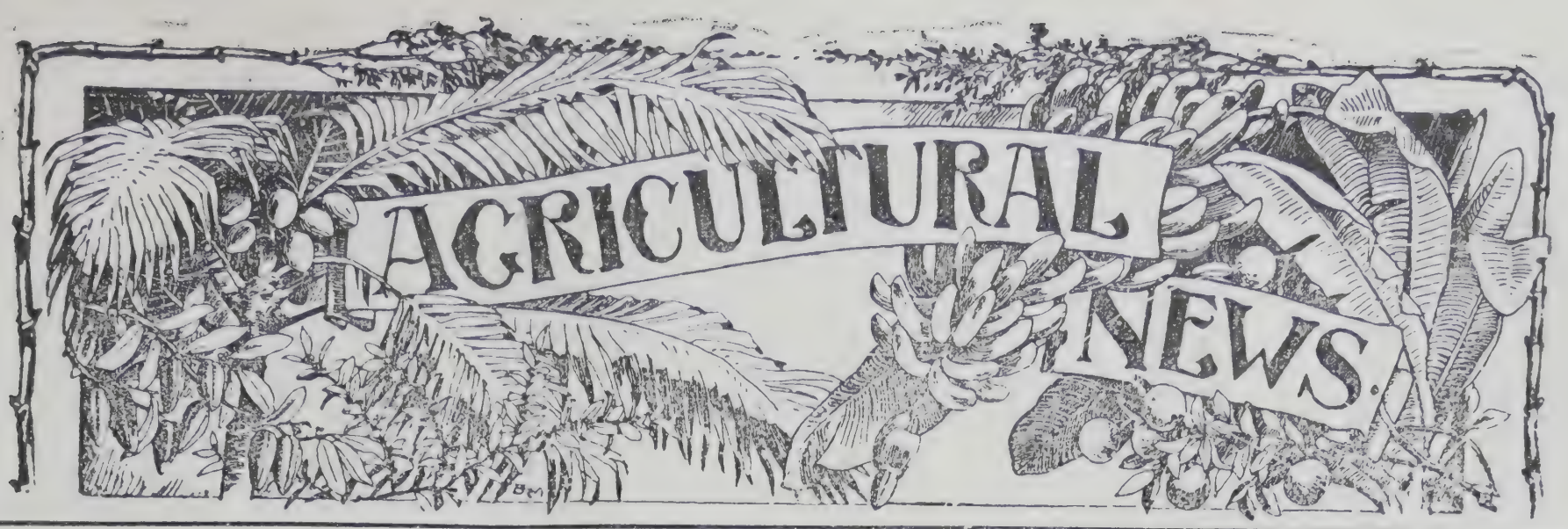
British Guiana,—November 30, 1907.—Messrs. WIETING & RICHTER.

ARROWROOT—St. Vincent, \$10.50 per barrel.  
 BALATA—Venezuela block, 32c.; Demerara sheet, 48c. per lb.  
 CACAO—Native, 20c. to 21c. per lb.  
 CASSAVA—No stock.  
 CASSAVA STARCH—\$9.00 per barrel.  
 COCOA-NUTS—\$12.00 to \$16.00 per M.  
 COFFEE—Creole, 13c.; Jamaica, 12c. per lb.  
 DHAL—\$4.15 to \$4.25 per bag of 168 lb.  
 EDDOS—\$1.92 to \$2.16 per barrel.  
 MOLASSES—18½c. per gallon.  
 ONIONS—Madeira,  $2\frac{1}{4}c.$  to  $2\frac{1}{2}c.$ ; Lisbon  $2\frac{1}{2}c.$  per lb.  
 PLANTAINS—20c. to 60c. per bunch.  
 POTATOS,—Madeira,  $\frac{3}{4}c.$  to 1c. per lb.  
 POTATOS, SWEET—Barbados, \$1.92 per bag.  
 RICE—Ballam, \$6.40; Creole, \$4.60 to \$4.75 per bag; Seeta, \$6.00 per bag.  
 SPLIT PEAS—\$3.75 to \$7.50 per bag (210 lb.).  
 TANNIAS—\$3.36 per bag.  
 YAMS—White, \$3.24; Buck, \$3.50 per bag.  
 SUGAR—Dark crystals, \$1.95 to \$2.20; Yellow, \$2.80 to \$3.00; White, \$3.50 to \$3.75; Molasses, \$1.70 to \$1.90 per 100 lb. (retail).  
 TIMBER—Greenheart, 32c. to 55c. per cubic foot.  
 WALLABA SHINGLES—\$3.50 to \$5.50 per M.

Trinidad,—November 30, 1907.—Messrs. GORDON, GRANT & Co.

CACAO—\$19 to \$21.00 per fanega; Venezuelan, \$19.00 to \$21.00 per fanega.  
 COCOA-NUTS—no quotation.  
 COCOA-NUT OIL—80c. per Imperial gallon.  
 COFFEE—Venezuelan, 7c. to  $7\frac{1}{2}c.$  per lb.  
 COPRA—\$3.25 to \$3.50 per 100 lb.  
 DHAL—\$4.40 to \$4.50 per 2-bushel bag.  
 ONIONS—\$2.25 to \$2.50 per 100 lb. (retail).  
 POTATOS, ENGLISH—\$2.00 to \$2.40 per 100 lb.  
 RICE—Yellow, \$5.50 to \$5.60; White, \$5.50 to \$6.00 per bag.  
 SPLIT PEAS—\$6.00 to \$6.10 per bag.  
 SUGAR—Grocery grades, \$1.60 to \$3.25 per 100 lb., according to quality.





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reprinted in *Science*, for December 6, gives a detailed review of the work that has been done during the past thirteen years, and of the present conditions of activity in practically all countries of the world where attention is paid to the question of economic entomology. It naturally contains a large amount of interesting and useful information, some of which is well worthy of attention in these colonies.

Speaking of the subjects that have demanded a chief share of attention since 1894, Dr. Howard mentions three in particular : (1) the San José scale insect (*Aspidiotus perniciosus*), which has been specially prominent in the United States ; (2) the work done in connexion with the study of insects injurious to health ; and (3) the method of attacking injurious insects by the introduction of other insects to act as parasites on the particular pests to be dealt with.

With regard to the San José scale, it is stated that this one pest has been responsible, during the past thirteen years, for more legislation (chiefly in the United States) than all the other subjects of entomology combined. Hundreds of thousands of pages have been written on the subject, and hundreds of thousands of dollars lost through its ravages ; but as the result of the work of the numerous entomologists employed to deal with it, millions of dollars have been saved.

With regard to the second question, viz., work done against insects injurious to public health—this is a subject in which the whole world, and not merely a community, is vitally interested. It was known in 1894 that Texas fever in cattle was conveyed from one animal to another by a tick, and that the causative organism in malaria is a protozoan inhabiting the red blood corpuscles. It was not known, however, till Ross

Recent Progress in Economic Entomology.

ONE of the principal addresses delivered at the Seventh International Zoological Congress held at Boston in August last, was that by Dr. L. O. Howard, chief of the U.S. Bureau of Entomology, entitled, 'Recent Progress and Present Conditions of Economic Entomology.' This address, which is



made his discovery some years later, that this organism is carried about in the body of a mosquito. It is only within the last eight years that the ticks and mosquitos of the genera *Anopheles* and *Stegomyia*, and many other biting flies, fleas, etc., have come to be recognized as menaces to public health, and methods have been devised for their control. In this connexion Dr. Howard mentions the measures carried out by English workers (more especially those connected with the Liverpool School of Tropical Medicine) for the destruction of mosquitos in various English tropical possessions, and the valuable work done by the American Army surgeons in Cuba in 1898 towards ridding that island of yellow fever.

The international work of introducing parasitic enemies of insects which are themselves injurious is described as having developed to a very great extent during the past thirteen years, although the first successful experiment in this direction on anything like a large scale, was concluded in California twenty years ago. In this work, the United States have been joined by Hawaii, and by Western Australia, South Africa, the British West Indies, Egypt, Portugal, Italy, France, and Chile.

Another problem of paramount interest in the entomological world has been how best to prevent the spread of the Mexican cotton boll weevil (*Anthonomus grandis*) in the United States. Originally occurring within a limited area in Texas, where it could easily have been stamped out had the Government of the State adopted the measures recommended by the Bureau of Entomology of the United States, this pest has spread from State to State with enormous rapidity, and is now responsible for an annual loss estimated at from \$15,000,000 to \$30,000,000. The cost of carrying out the recommendations brought forward in the first place would have been about \$25,000. The result of this fatal economy of ignoring expert advice, on account of the expenditure entailed in carrying it out, is therefore at once apparent.

During the past six years, a specially selected staff of entomologists has been engaged in studying every phase of the life-history of the cotton boll weevil, and as a result, an enormous mass of information concerning the insect has been accumulated, which has probably never been exceeded in the case of any other species.

A large part of Dr. Howard's paper is taken up with an account of the amount of recognition entomological work has received from Governments and other control bodies, in different countries of the world, in the

form of grants of money and facilities for carrying on investigation.

It is well known that in the United States, economic entomology has been able to make the most material advances. In 1894, the United States Division of Entomology received a Government grant of \$30,000, and its staff at that time consisted of the chief with eight scientifically trained assistants. To-day, its annual budget has increased to \$340,000, and its pay-roll includes 100 scientific assistants together with 250 other employees.

The agricultural stations in the United States that employ entomologists number fifty-one. Down to the present time, the total number of entomological publications issued by the State and agricultural experiment stations has reached 1,300.

Dr. Howard deals at considerable length with the conditions that at present exist in other countries, but these appear to be nowhere so encouraging as in the States. He mentions, especially, the good work of Dr. James Fletcher in Canada, who, however, is unfortunately handicapped for want of funds. Much the same thing may be said in reference to the work of Mr. Walter E. Collinge, of the University of Birmingham, and of Mr. F. V. Theobald, of the Wye Agricultural College, England. The remarkable services to English economic entomology of the late Miss Ormerod are also referred to.

In giving an account of the conditions in the British West Indies, Dr. Howard says:—

'The situation in the British West Indies has changed radically since 1894. The Imperial Department of Agriculture was organized in 1898 and Sir Daniel Morris was appointed Commissioner.

'In 1899, Mr. Maxwell-Lefroy—who has since been transferred to a post under the Government of India—was appointed Entomologist. He was succeeded in 1903, by Mr. H. A. Ballou, of Massachusetts. Mr. Ballou has done good work in investigating the injurious insects throughout the area over which the Department extends, and he has published entomological information in the various periodicals and reports issued by the Department.'

In reviewing the whole of the work of the past thirteen years, it is at once apparent that great advances have been made in economic entomology within this period—greater advances, probably, than during the entire previous history of the science. It must be admitted, too, for it is obvious to all, that the greater part of this work has been done in the United States of America.



## SUGAR INDUSTRY.

### Sugar Crop Prospects in Trinidad.

According to a report in the *Port-of-Spain Gazette* of December 15, sugar growers in Trinidad are looking forward to a good crop during the coming reaping season.

Weather conditions throughout the past year have been very satisfactory, not only for the cane crop, but also for cacao and minor products. A rainfall of 9.68 inches was experienced during the month of November.

A fortnight's showery weather that recently occurred has further improved the appearance of canes still under growth for reaping in March and April next, and crop prospects generally appear more encouraging as the cane-cutting season approaches.

The sugar factories are being got ready, and it is expected that the second week in January will find most of them actively at work.

Replanting for the 1909 crop is reported as coming to a close, although a good deal of 'supplying' has been necessary in some hilly localities.

The *Gazette* report refers specially to the outlook from the point of view of the cane farmer, whose prospects, it is remarked, are distinctly better than at the corresponding period of last year. This is said to be, to a large extent, due to greater care having of late been exercised by many of the cane farmers in regard to the varieties of cane cultivated, and also to the fact that, recognizing the value of pen manure as a crop-producing agent, much more of it has latterly been applied to their holdings by these small growers.

### Sugar Industry in Russia.

At the present time, when much is being heard of Russia and her sugar industry, in connexion with the Brussels Convention, some facts concerning the development and extent of that industry may not be without interest.

It is stated, in an article entitled 'Some Aspects of the Russian Sugar Industry,' which appeared in the *International Sugar Journal*, that the first Russian sugar factory was started as long ago as 1802, and that the development of the industry became quite appreciable by 1825.

The industry is largely centred in the south-western provinces of Russia, where most of the sugar factories are to be found.

The Russian area under beet cultivation has increased year by year, but up to 1895 the annual extensions were very small. From 1885 to 1894, inclusive, the total increase was only 21,600 acres, or 2.7 per cent. During the ten years from 1896 to 1906 however, the area devoted to beet culture increased from 864,000 acres to 1,317,000 acres. In the same period there was also a considerable rise in the number of sugar factories at work in the country.

The Russian sugar factories themselves grow a certain amount of the beet required by them, but obtain the greater part from neighbouring landowners and well-to-do peasants, with whom contracts are entered into. It is stated that, in order to obtain the best raw material, the sugar factories supply these growers with a quantity of the best beet seed sufficient to meet the demands of the area they have contracted to cultivate.

In the estimates of sugar production of all the countries engaged in the industry, as given in the *Year-book for 1906* of the U.S. Department of Agriculture, the beet sugar yield of Russia for 1902-3 is placed at 1,256,311 tons. The crops of the two following years show a falling off in the amount of sugar produced, but an increase was again apparent in 1905-6, and the Russian sugar crop in 1906-7, is estimated at the unprecedented figure of 1,450,000 tons.

According to the *U.S. Year-book*, Russia exported 128,839 tons of sugar in 1902, this increasing to 241,258 tons in 1903. In 1904, the latest year for which the complete figures are available, there was a drop in the sugar exports, but no doubt this is only temporary.

Labour is very cheap in Russia, and it is said that the total cost of beet cultivation, from sowing the seed to raising the crop, is no more than £4 15s. per acre.

The Russian sugar factories provide employment for about 170,000 persons, the average for each factory being about 500. Men earn from 1s. to 2s. per day, and women from 10d. to 16d.

### Sugar-cane Seedling D. 74 in Louisiana.

The Demerara seedling cane D. 74 appears to be a great favourite among sugar growers in Louisiana. In the *Louisiana Planter* of November 16 last, appears an article dealing with the condition of the crops between New Orleans and Baton Rouge, throughout 90 miles of good cane-growing country, and the writer comments upon the considerable area now devoted to this cane.

To quote from the article in question :—

A conspicuous feature along the whole route between New Orleans and Baton Rouge is the large amount of D. 74 cane now standing in the fields. The evidence brought out thus far as to the excellence of this cane has carried conviction with it into the minds of the sugar planters, and their experiments are now being made on a very large scale. We hope this season will settle definitely the superiority, or inferiority, of this sugar-cane to all others that we have in Louisiana, when all conditions incident to our Louisiana cane culture are considered.

Apart from the rigidity of these canes and the danger of their breaking off, rather than falling down, in time of storms, there comes the cost of cane cutting by our ordinary hand process, and thus far we know of no other method successful in the ordinary cane harvest. Whether the belief be well founded or not, there is an idea prevailing that it will cost more per ton to cut this D. 74 sugar-cane than to cut the ordinary Louisiana sugar-cane. This additional cost is thought to inhere in the cane itself, the leaves being closely attached thereto and more difficult to separate in the ordinary process of cutting. A minor difficulty is that the canes are green in colour, and the point of ripeness at the top is not readily ascertainable, and the canes may be cut too long, or too short, for the mill. Presumably experience will familiarize our cane cutters with this phase of the question, and they will soon learn the proper point at which to cut the cane. On the other hand, the erect habit of this cane, which keeps it standing notwithstanding the effects of comparatively severe storms, makes it easier to cut than it is to cut blown-down canes of our ordinary Louisiana varieties. Again, these D. 74 canes sucker so greatly that immense masses of the cane grow in spots and necessarily all of the canes become rather slender. Anyway, this season will do much to solve the industrial problem involved in the culture in Louisiana of this very excellent seedling, D. 74.





## WEST INDIAN FRUIT.

### COCOA-NUTS IN JAMAICA.

Writing to the Imperial Commissioner of Agriculture on November 22 last, the Secretary of the Jamaica Agricultural Society says, with reference to the cocoa-nut supply of the island:—

We have exported, from April 1 to November 2 of the present year, 8,706,128 cocoa-nuts as against 4,398,462 for the same period last year, and the price this year has been nearly double what it was in 1906. The price paid on the spot at present is 115s. per thousand. As you are probably aware, there is a world's shortage, and this is the cause of the great demand and the high prices here. The drought has affected our cocoa-nuts less than any other crop; it has not to any appreciable extent lessened the quantity exported, but it has affected the grade of the exports. This, however, is improving every week, and within three months we ought to be up to our average grade again.

### AVOCADO PEARS: PREPARATION AND SHIPMENT.

In *Bulletin No. 14*, of the Hawaii Agricultural Experiment Station, a considerable amount of valuable advice as to the best methods of picking, packing, and shipping avocado pears is given to growers who may be thinking of trying to build up an export trade in this line.

The fruit sent in an experimental shipment from Hawaii to the United States was packed in the refrigerator compartments of the vessel, with the exception of a few cases which were carried on the main deck. The packages were on board seven days, this being followed by a two-days' railway journey in hot weather. It will be seen, therefore, that the conditions of shipment were not particularly favourable, but the results of the trial were encouraging, and showed that shipments on a profitable commercial scale were certainly possible.

The writer of the article impresses upon the would-be shippers of avocado pears the importance of great care in packing the fruit. Each fruit must be gathered by hand, and the stem should be cut with a pair of shears, as in the case of oranges. Slight bruises, although not evident at the early stage, are very apparent when the fruit is placed on the market.

It is advised that picking should be done, if possible,

only on the day when the steamer is to leave; certainly not earlier than the evening before. Careful grading of the fruit is very important, as the way in which this operation is done has a great deal to do with the price obtained on the market. If the unusually fine and large pears are put in the same package with average fruits, they not only lose the special price they would command if presented by themselves, but also have the result of making average fruit appear inferior by contrast. Good quality fruit, even of second grade, if neatly packed, should always find a ready market, but, if placed with the best specimens, the value of the whole is lowered.

Avocado pears, it is advised, should not be packed in boxes of too large a size. The size of crate recommended as being likely to give satisfactory results for medium-sized fruits is of the following dimensions:  $13 \times 14 \times 3\frac{3}{4}$  inches inside measurement. Such a crate would hold about one dozen pears. It will be seen that boxes of this depth allow of only a single layer of fruits. For large-sized avocados, the depth must be increased to at least 4 inches. In packing, it is recommended that, as with oranges intended for export, each fruit should be wrapped in a piece of paper just large enough to make a single cover. Over 160 pears with nothing but a single paper wrapping, arrived at Portland, Oregon, from Hawaii, with a loss of only 2.9 per cent. Fruits packed more elaborately, e.g., in individual compartments, provided by the use of corrugated straw board, were in no better condition on arriving at their destination. In placing the individual pears in the boxes, jarring is only prevented by packing them as close together as possible, although it is not advisable to induce any pressure.

The provision of holes in the sides of the boxes and the spacing between the boards forming the cover, ensure a suitable ventilation of the fruit. A narrow piece of wood too, is nailed along two opposite edges at the top of each box. By this means the passage of a current of air between each box and the one above it, is made possible. The most suitable temperature for storage of avocado pears, it is said, is not yet definitely decided. Prolonged storage in the refrigerator compartment, however, is mentioned as resulting in the blackening of the interior of the avocado. It is recommended, as a result of observations made, that the temperature should not be allowed to fall below  $40^{\circ}$  F. The refrigerator room in the ship should be cooled as rapidly as possible so as to lower the temperature of the fruit, and a uniform temperature should be maintained throughout the voyage.



## COLONIAL FRUIT AND VEGETABLE SHOWS.

The attention of members of Permanent Exhibition Committees and of others in the various West Indian Islands is drawn to the following circular letter which has been issued by the Secretary of the Royal Horticultural Society of England, in reference to the three shows of Colonial Fruit and Vegetables which the Society proposes to hold in London during 1908:—

The President and Council of the Royal Horticultural Society have again arranged to hold Exhibitions of Colonial Grown Fruits and Vegetables on the following dates:—

Thursday and Friday, March 5 and 6.

" " " June 11 and 12.

" " " Nov. 26 and 27.

In fixing such dates the object aimed at is to suit the season which is most likely to find the produce of the Cape and India; of Australia, Tasmania and New Zealand; and of Canada, British Colombia, and the West Indies in the greatest perfection in London. Opportunity is afforded for each colony to make collective exhibits in addition to the exhibits of individual growers or firms.

These Exhibitions were originally organized in 1904, and have been the means of bringing before the British fruit merchants and fruit-consuming public, the wonderful resources of the British fruit markets quite independently of the foreigner. The Society's sole object is the advancement of the interest of the colonies (a) by stimulating the production of better fruits, (b) by giving advice and assistance in the difficulties ever confronting fruit growers, and (c) by helping to inform the home market. The results have been encouraging, for even in so short a time as the last three years a distinctly better quality of fruit has been sent, those recently shown being of an approved appearance, less blotched by fungus, scale and other defects, and better packed. At the same time the Council are disappointed at the lack of exhibitors and the smallness of their exhibits. Fruit growers in the colonies are therefore asked to assist their own future competition in the market by competing in the present Exhibitions, invitations to which will be sent to the Colonial and Government Offices, the Embassies, the leading London fruit merchants, colonials on furlough, and many others.

The Agents-General and other authorities are most kindly rendering every assistance, and we trust that both growers and shippers will do their best to send in exhibits worthy of our colonies, and to show what can be produced for the Home markets. No entrance fee or charge for space is made, and tabling is also provided free of expense. If desired, any produce may be consigned direct to the Society, and it will be stored in the cellars at St. Vincent Square and staged by the Society's Officials, but the Society cannot undertake to repack and return any exhibits.

The Secretary of the R.H.S., Vincent Square, Westminster, will be pleased to furnish intending Exhibitors and others with any information, and to forward Entry Forms and Schedules.

Lectures on the Colonial Fruit Industry will be given on the first day of each show.

If the above shows are well supported by the Colonies concerned, three further exhibitions will be held in 1909, on or about March 11 and 12, June 10 and 11, and November 25 and 26.

The entries close a week before the show in each case.

## VARIETIES OF SWEET POTATOS AND EDDOS.

Below is given a list of different varieties of sweet potatoes, and also a list of varieties of eddos that are at present in cultivation on land under the care of the Agricultural Superintendent at Barbados. Any officer of the Department desirous of obtaining a select number of these varieties should communicate early with the Imperial Commissioner, Head Office, Barbados.

### LIST OF SWEET POTATOS.

Cawnpore Local.  
Thegania Red  
Thegania White  
Poona Local  
Carolina Extra Early  
Kapo  
India Red  
Southern Queen (weak type)  
Southern Queen (strong type)  
Vineless Beech  
Dhamakia White  
Red Nansemond  
Japan Brown  
Norton  
Barbados Caroline Lee  
John Burnett  
Johns  
Pikonui  
Caroline Lee  
Georgia  
Alabarra  
Ihumai  
Yellow Red

Van Ness Red  
Shanghai  
Pumpkin  
Early General Grant  
Florida  
Kamelo  
White Gink (6 months.)  
Kala  
Yellow Strausberg  
Hailonaipu  
Ticotea  
Vincelonian  
Pepper's Choice  
Bronze Spanish  
Pilipili  
Red Jersey  
White Gink (3 months.)  
Kanahehe  
Nancy Hall  
White Sealy  
Trinidad, No. 1  
Key West.

### LIST OF EDDOS.

Faro Japanese  
Malanga Blanca  
White Leftman  
White Eddo  
Belembe  
Prieta  
Button Fania  
Orqueta  
Unknown  
Malanga (Bea Cuba)  
Red Tacca  
Jeremy Barbados  
Blanca  
Amarilla  
Rollisa

China eddo  
Grey Jack  
Trinidad Yellow  
Banana Fania  
Dasheen  
Milady  
Dominica  
Choice Marquis  
Guayamera (Colorada)  
Gris Amarilla  
Leefman  
Gengibrilla  
Jamaica Trin  
Punzera

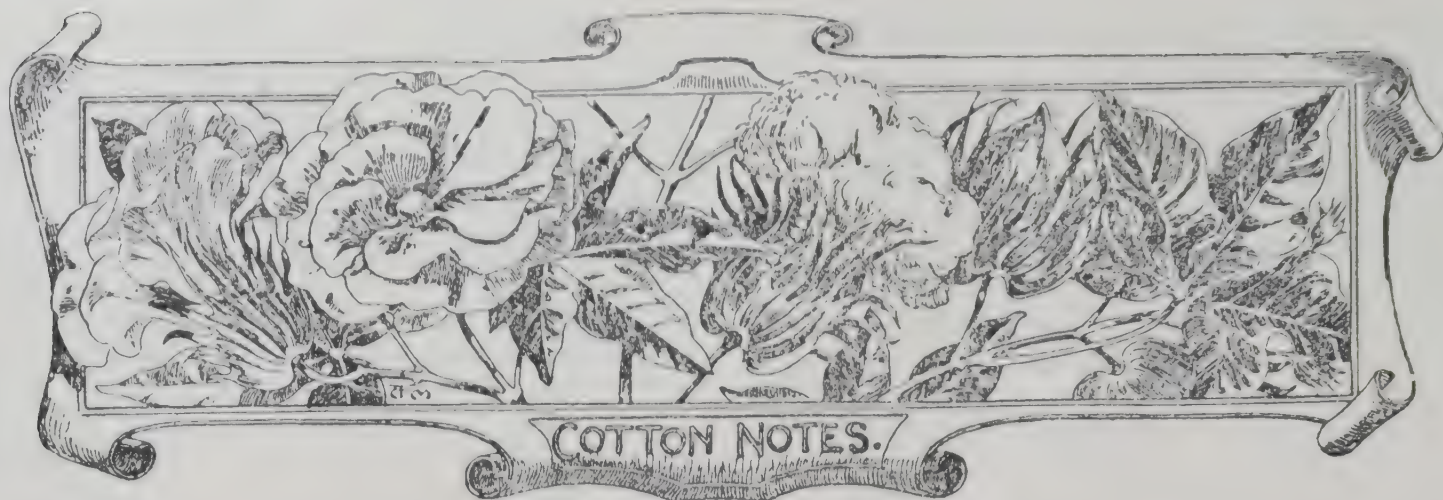
## CANADIAN EXHIBITIONS, 1907.

The following interesting letter from Messrs. Pickford & Black, has been received by the Imperial Commissioner of Agriculture, in reference to the Canadian Exhibitions of this year:—

We are in receipt of your favour of the 11th instant, dated at Toronto, and are pleased to note you are satisfied with the way in which the West India exhibits were handled. Quite a number of Nova Scotians who were there spoke in the very highest terms of the display.

We sincerely trust that the Exhibitions both at Toronto and Halifax will prove of benefit to the West Indies and also to our country, and that trade between Canada and the West Indies will largely increase.





### WEST INDIAN COTTON.

Messrs. Wolstenholme & Holland of Liverpool, write as follows, under date of December 9, with reference to the sales of West Indian Sea Island cotton:—

The market for Sea Island cotton remained steady for all the higher grades, since our last report, but there is a plentiful supply of the lower qualities of Georgia and Florida offering to arrive at 12*d.* to 16*d.*

About 100 bales of new crop West Indian have arrived during the last fortnight, chiefly Barbados, and St. Kitt's; prices range from 18½*d.* to 22*d.*, but only a few bales of superfine have been sold at the latter price, and there is a disinclination to pay more than 20*d.* for anything except superfine.

The financial crisis in America has had a rather depressing effect on trade, and makers of fine yarns find a difficulty in getting orders, and are therefore not eager to purchase cotton.

### COTTON INDUSTRY IN ST. VINCENT.

In a letter to the Imperial Commissioner of Agriculture, dated December 16 last, Mr. W. N. Sands, Agricultural Superintendent of St. Vincent, sends the following particulars relating to the cotton crop of the island:—

The plants have ripened much earlier this year and are in full bearing. Satisfactory pickings continue to be made. No further attack of the cotton worm has been reported. The black scale is now much in evidence on some estates, and it has been recommended that as soon as picking is finished the plants be burnt. This is a pest which will have to be closely watched in the future.

Cotton ginning is in full swing at the ginneries. At the Central Cotton Ginnery, 77,817 lb. of lint or 216 bales have been turned out as a result of twenty-one days' work. Satisfactory progress is also being made at Mr. C. J. Simmons' ginnery.

The first large shipment of 148 bales was made last mail, and it is expected that a larger shipment will be made to-day, if there is cargo space available.

It may be of interest to add, that the first 2 bales from Messrs. Porters' Carib country estates have been ginned. The cotton was of a very good quality.

The estimate of the area in cotton cultivation here this season is 3,200 acres. The four largest growers are as follows: Mr. C. J. Simmons, 600 acres; Mr. Alex. Smith, 550 acres; Messrs. D. K. Porter & Co., 392 acres; Messrs. J. H. Hazell & Co., 200 acres. Five others have in an aver-

age of over 100 acres each. Small growers of from 1 acre to 20 acres, have altogether planted about 280 acres.

### COTTON REPORTS FROM THE SEA ISLANDS.

In their Sea Island cotton report, dated November 30, Messrs. Henry W. Frost & Co., of Charleston, write:—

The demand for fine and fully fine cotton continues active, and all offerings are taken at very firm prices. This active demand has caused factors to refuse to sell further except at an advance. Since the close of the report a sale of 700 bales has been made which will take the larger part of the receipts for the coming week.

Present prices: Extra fine, 20½*d.* to 21*d.*; fully fine, 19½*d.* to 20*d.*; fine, 18½*d.* The small receipts over the past week confirms the opinion that the crop will fall short of early estimates.

On December 7, Messrs. Frost write:—

In our last report, we mentioned the sale in advance of 700 bales; the odd bags of cotton received during the week were no more than sufficient to supply this quantity, leaving the market bare of stock. Prices have advanced from ½*d.* to 1*d.* per lb. as compared with those of last week.

### PREPARATION OF COTTON FOR MARKET.

The accompanying note drawing attention to the importance of special care in the preparation of Sea Island cotton for market is taken from *Farmers' Bulletin 302*, of the United States Department of Agriculture—'Sea Island Cotton,'—a valuable little publication from which many extracts have been already made for the *Agricultural News*:—

Next in importance to seed selection is the preparation of the staple for market. Sea Island cotton from the mainland has an unenviable reputation for poor preparation, as compared with the Carolina Sea Islands product. The farmers seem not to consider the delicate nature of the staple, and handle it as carelessly as they would Upland varieties, whereas it requires special care at every stage from boll to bale. Too often it diminishes in value by exposure to weather in the field, by being mingled with broken leaves and yellow cotton in picking, by being stored undried when gathered damp, or by careless ginning. The lustre of the staple once lost can never be regained. The admixture of weak and stained cotton means a loss to the spinner from waste and from cost of cleaning, and this loss must be made good by a reduction in the price paid the farmer.



## SEA ISLAND COTTON AND SEED SELECTION.

The particulars given below as to the origin of the Sea Island cotton, and the methods of seed selection practised in those islands from which the cotton takes its name, are reprinted from *Farmers' Bulletin* 302 of the United States Department of Agriculture, entitled 'Sea Island Cotton':—

The high quality of Sea Island cotton to-day is due to the careful seed selection that has long been practised on the Carolina Sea Islands. Seed selection is therefore a feature of prime importance. To realize its influence on the industry one must trace its history from the beginning. As indicated by its botanical name—*Gossypium barbadense*—the original home of the plant is thought to have been the West Indies. When first introduced into the mainland of America, about 1786, it is reported to have been considerably different from the present form. The plant was a perennial—larger, later, and less productive than now. The method of culture in vogue was adopted to reduce the size of the plant and stimulate fruitfulness, but the great change that has been wrought is due mainly to careful breeding. Through several generations the planters have selected seed from the earliest, most compact, and most productive plants, with the longest and finest staple, until the character of the plant has been radically changed.

The cotton plant has become variable, enabling the breeder to select finer forms and to raise the standard of the crop far above its natural level. By reason of this variability, seed selection must be continued to prevent deterioration, for there is no standing still. The upward movement must be continued by perpetuating the finer types desired by the cultivator, or, if neglected, the inferior plants will increase rapidly in the crop and the cotton will tend to revert to its original type.

There has developed on the Sea Islands a well-defined and uniform system of selection. It is based on the correct idea—that of discovering the best individual plant and preserving its offspring. A number of superior plants are marked and carefully compared in the field, then picked separately, and the seed-cotton is critically examined. The best plants are retained and the seeds planted in a plot by themselves, one or two in a hill, making perhaps 500 plants in all. If this plot retains the good qualities of the parent plant the cotton is picked and the seeds are again planted separately, making a 5-acre plot the third year. The fourth year there will be seed enough to plant the whole crop, all descended from the single stalk first chosen. A new individual plant is selected every year, so that a fresh supply of seeds is always being grown. Seed from the general crop is considered less desirable for planting at home, and was formerly sold to Georgia and Florida growers.

Many of the Sea Island varieties, particularly the finer ones, are considered the property of the originator, who will not part with any of his seed, even to his neighbours. To do so would be likely to result in an overproduction of the particular staple and a lowering of prices, as the market demand for lighter staples is exceedingly limited. Furthermore, the breeder is as much entitled to reward for his labours as the inventor of a new machine is to his patent rights. A strain of fine cotton is the product of many years' careful selection, and could not be duplicated without long-continued work requiring much skill and care.

On the Sea Islands the growers of medium staples, for which there is a larger market than there is for the finer product, have for many years sold their seed both at home and to buyers in Georgia, Florida, and foreign countries.

In 1904, however, West Indian competition stimulated the formation of an association to prevent the sale of seed outside the Sea Islands, and at the present time this embargo is still in force. The right of these growers to dispose of their product as they see fit is not questioned. Their action, however, will have great influence on the interior sections, which have always depended on Sea Island seed. Georgia and Florida produce eight-ninths of the American crop, but because of the total neglect of seed selection, deterioration has been rapid there, requiring renewal of seed every few years.

Thrown on their own resources, the interior growers will find that they can grow their own seed and maintain a satisfactory quality. The success of the Carolina planters is due to their methods more than to their soil and climate. There are already men in Georgia and Florida who have maintained the quality of their cotton for fifteen years or more without selection or renewal from the Sea Islands. In fact, it should be possible to produce a variety better fitted for interior conditions than any imported seed, for adaptation to climate and soil can be secured together with greater productiveness.

## PACKING RUBBER SEEDS.

In a brief article entitled 'The Transport of Para Rubber Seeds', which appeared in the *Kew Bulletin* No. 8, (1907), attention is drawn to a paragraph from the *Report of the Department of Public Gardens and Plantations*, Jamaica, 1905-6, relative to the packing of Para rubber seeds. The *Report* says:—

A consignment of 7,500 seeds, packed with incinerator earth and sawdust, in biscuit tins, was forwarded from Singapore by parcel post on August 31, and arrived in Jamaica on October 25, 1905. Forty-five seeds were rotten when received: 7,455 seeds were sown, and of these 6,506 germinated, or 87 per cent. of the number sown. Of the 6,506 plants potted, 1,435 were constitutionally weak, and died soon after potting. There were thus obtained 5,071 plants, or about 68 per cent. of the number of seeds sown.

On January 30, 1906, 725 seeds were received from Para. They were packed in powdered charcoal and only fifteen were bad on arrival. From the 710 seeds sown, 656 plants were raised, or about 90 per cent.

It does not appear to make any difference what the packing material may be, so long as it is dry. Sifted dry earth is, perhaps, the best material to recommend, as it is always possible to obtain it.

## ACOMA St. CHRISTOPHE.

Specimens of the flowers and leaves of a useful Dominican timber tree known locally as the 'Acoma St. Christophe', and considered by Mr. Jones, Curator of the Dominica Botanic Gardens, to be a species of *Sideroxylon*, were some time ago forwarded to Mr. Hart, Royal Botanic Gardens, Trinidad, for identification.

Writing to the Imperial Commissioner of Agriculture on October 21 last, Mr. Hart says:—

The plant sent by you is not represented in our Herbarium. It is not the Trinidad *Sideroxylon Mastichodendron*, Jacq., but answers very well to the description of *Sideroxylon floribundum*, Gr., n. sp. (p. 399, *Grisebach's Flora*). *S. Mastichodendron*, Jacq., is known as 'Acoma', in common with several other members of the Sapotaceae, all of which are useful timbers.



## EDITORIAL NOTICES.

Letters and matter for publication, as well as all specimens for naming, should be addressed to the Commissioner, Imperial Department of Agriculture, Barbados.

All applications for Copies of the 'Agricultural News' should be addressed to the Agents, and not to the Department.

*Local Agents:* Messrs. Bowen & Sons, Bridgetown, Barbados. *London Agents:* Messrs. Dulau & Co., 37, Soho Square, W., and The West India Committee, 15, Scething Lane, E.C. A complete list of Agents will be found on page 3 of the cover.

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# Agricultural News

VOL. VI. SATURDAY, DECEMBER 28, 1907. No. 148.

## NOTES AND COMMENTS.

### Contents of Present Issue.

The advances that have been made in economic entomology, since 1894, are reviewed in the editorial.

A good sugar crop is anticipated in Trinidad in the coming reaping season (p. 403). A brief account of the Russian sugar industry will be found on the same page.

An article (on p. 404) gives some useful hints as to the best methods of picking and packing avocado pears intended for export. Three colonial fruit and vegetable shows are to be held in London in 1908 (p. 405).

Brief notes on the cotton pages (406-7) give information as to present prices of Sea Island cotton, condition of industry in St. Vincent, etc. There is also an article describing the method of seed selection followed in the Sea Islands.

The concluding portion of the article 'the Study of Insects' will be found on page 410.

On the following page are given some interesting particulars with regard to the rapid development of the rice industry in British Guiana.

Present and prospective lime planters will find a considerable amount of detailed and valuable information as to methods to be followed in preparation of land, sowing of seed, tillage operations, etc., for lime culture on pp. 414-5.

### The Late Mr. W. R. Buttenshaw.

In a letter to the Imperial Commissioner of Agriculture, dated November 11 last, Mr. J. Arthur Hutton, Chairman of the British Cotton-growing Association, writes: 'At the meeting of the Committee held lately the greatest sorrow was felt at the announcement of the death of Mr. Buttenshaw, and I was asked to write to you to convey to all his friends our deepest sympathy with the loss that has occurred.'

'I can assure you that both Mr. Oliver and I were much struck with Mr. Buttenshaw during our short visit to St. Vincent and Barbados. He was always hard at work, and was a most pleasant and interesting companion in every way, and I feel perfectly certain that everyone who knew him will have heard the news of his death with the very greatest regret.'

### Sugar Industry in New South Wales.

In spite of the heavy bounties that have been paid to sugar growers in New South Wales (£263,917 since 1903-4), figures given in the *Melbourne Journal of Commerce* indicate that the area devoted to the cultivation of the cane crop is decreasing rather than extending. In 1903-4, the cane-sugar area was 24,579 acres. This has decreased to 20,601 acres in the present year, and a further decline is expected for 1907-8.

About 90 per cent. of the acreage is tilled by white labour, and the remainder by black. The shrinkage is most apparent in the white labour sugar area, although it is noteworthy that, notwithstanding the diminution of 26½ per cent. in the cane-sugar acreage worked by white labour, the output of sugar from this area has increased from 19,236 tons in 1903-4 to 22,000 tons in 1906-7.

This falling off in the acreage devoted to sugar cultivation is, to a large extent, attributed to the superior attractions of dairy farming.

### Tobago School Show.

The Tobago annual School and Needlework Show, recently held in the Market Square, Tobago, is reported to have been most successful, and to have shown great improvement upon exhibitions of previous years both in the quantity and quality of the exhibits. This was the first occasion on which an animals' section was included, and the large number of entries made more than justified the new step. The increasing interest taken in these shows by peasant proprietors was evidenced by the record number of exhibits on display in the small holders' section.

The produce sent in by the schools was of very good class, the Toco Catholic School getting first place and winning the medals offered by Mr. Martinez of Barbados, and Professor Carmody. The Montgomery Moravian, and the Scarborough Catholic Schools came second and third respectively.

Speeches were made at the meeting by Mr. W. H. Gamble (the Warden), Lt.-Col. J. H. Collens, Inspector of Schools, and others. About two thousand people attended the show.



### Fruit-preserving Industry.

A shipment of tasty fruit preserves, comprising guavas in syrup, guavas in jam, guava jelly, mango marmalade, pine-apple jam, lime marmalade, etc., recently sent from Jamaica to British Guiana, is commented upon by the *Demerara Argosy*, which points out that since the guava, the mango, and the lime grow as well in British Guiana as in Jamaica, there is no reason why a local industry in the preparation of the above articles should not succeed, if established in the South American colony. Since there is an import duty of 6c. per lb. on preserves brought into British Guiana, it is apparent that a home-produced article would stand every chance of holding the local market against outside competitors.

This question of the establishment of a minor industry in the preparation of various kinds of fruit preserves is worthy of consideration in many of the West Indian Colonies. The necessary raw materials are produced in plenty on the spot, and provided that the articles were placed on the market in an attractive form, there seems to be no reason why an enterprising firm should not succeed in building up an export trade.

### Manuring Rubber Plantations.

This question was discussed in an article which appeared sometime ago in the *India-rubber Journal*, and although no series of experiments sufficiently extensive in character to warrant any general conclusions being arrived at, has yet been carried out, it has been shown that suitable manuring exercises a considerable influence on the rate of development of the rubber trees and the age at which they can first be tapped. Of course, when rubber is grown in conjunction with other crops, such as cacao, coffee, tea, etc., the aspect of the question is somewhat altered and the proportionate demands of these crops have to be considered.

Para rubber is the chief variety whose manurial requirements have been under consideration in the experiments that have so far been undertaken. The root system of *Hevea brasiliensis* grows very rapidly but is largely superficial.

In the Indo-Malaya region, a method which has been found to give good results with young trees is to dig trenches about a foot wide, just beyond the area of the growing roots, filling the trenches with any available organic matter, mixed with earth or with artificial manure. In older plantations, where the rubber roots permeate the whole of the soil, artificial manures can be mixed with dry earth and distributed, the ground being afterwards lightly forked.

The results of experiments to date clearly indicate the necessity of nitrogen and potash, more especially the latter. Excess of nitrogen, as might be expected, results in undue development of foliage.

It is claimed that judicious manuring enables the first tapping to take place from six to twelve months earlier than would otherwise be the case.

### Rubber Lands in British Guiana.

A Select Committee of the Court of Policy of British Guiana has brought forward, for consideration by the Legislature, extensive modifications in the conditions under which Crown lands in the colony may be taken up for rubber cultivation. It is recommended that land for this purpose shall not, in the first instance, be granted absolutely, but that it shall be leased for a period of ninety-nine years, the lessee, however, to have the right to purchase the land at the end of ten years, provided he shall have complied with the conditions of the lease.

Other recommendations are that no rent shall be charged for rubber land during the first ten years of the lease, but that during this period a royalty of 2c. per lb. shall be levied on all rubber produced. No royalty shall be payable after the expiration of ten years, but (if the lessee does not exercise his right to purchase the land) the annual rental shall be 20c. an acre from the tenth year to the fifteenth year, and 50c. per acre per annum from the fifteenth year onwards. The purchase price suggested is \$4.00 per acre.

As pointed out by the *Demerara Daily Chronicle*, if the above recommendations are approved by the Legislature of the colony, the resulting conditions should offer sufficient inducement to men of means, anxious to test the rubber-producing possibilities of the colony, and doubtless a good deal of land will soon be taken up.

### *Sansevieria grandis*.

In the *Kew Bulletin*, No. 9, of the present year, it is mentioned that a specimen of the fibrous plant, *Sansevieria grandis*, Hook, was recently sent to Kew from the Transvaal, for identification and for report as to its commercial value.

This plant belongs to what are known as the Bow-string hems, and it yields a fibre which is fine, silky, and elastic, and of extraordinary strength. The *Sansevierias* are chiefly of African origin, but some of the species are already widely distributed in tropical countries.

*Sansevieria grandis*, which possesses very large leaves—from 3 to 4 feet long, and 6 inches broad—is known in Cuba, where it appears to do well, and to have found congenial surroundings.

It is stated that *Sansevieria grandis* was introduced into Cuba by a company formed to grow the plant for its fibre, but that the operations of this company failed, owing to the cultivation not having been carried out in a practical manner.

Since the plant thrives so well in the island, however, it is more than possible that better success may attend future efforts towards systematic cultivation.

A specimen of rope made from the fibres of *Sansevieria grandis* was submitted by the Director of Kew Gardens, to Messrs. Ide & Christie, Fibre Brokers of London, who report 'it is a good-class fibre, much liked, its value being £35 per ton.' So far, however, it is reported that only sample bales of the fibre have been received in England.





## INSECT NOTES.

### The Study of Insects.

The abstract of the concluding portion of Mr. Ballou's lecture on the above subject is given herewith:—

Almost every insect is subject to the attacks of other insects, in addition to outside enemies; and but for this fact, a single insect species might infest and even overrun the earth. In the West Indies we have numerous examples of this among insects: notably the cases of the fluted scale, which is parasitized by the Australian ladybird, already mentioned, of the moth borer and cotton worm, and probably many other insects. The lacewing fly, and the ladybirds feed upon plant lice; the cane fly, and several of the scale insects have their parasites. The egg masses of cockroaches are parasitized. The cotton worm is attacked by the wild bee and the cow bee; other beneficial insects are the honey bee, the silk-worm, and the cochineal and lac insects. The so-called Spanish fly, which is used medicinally, is also an insect.

In their relation to plants, insects may also be beneficial. The pollination of many flowers can be accomplished only by insects. It was impossible to produce good Smyrna figs in California, until the fig insect was introduced from Algeria, because the pollination of the fig depends on this one insect, and because the quality of this fruit depends upon its being pollinated.

Another example of this dependence on insects is found in the case of the yuccas of the Southern United States, which can only be pollinated by a small moth (*Pronuba* sp.). It was shown how the parent moth collects the pollen from the stamens, and inserts it in the stigmatic tube of the flower, depositing her eggs in the ovary. The development of seeds is dependent on this pollination, and it is on these seeds that the young insects feed. The remarkable social communities of insects were briefly referred to, the termites, the ants, the honey bees, and the social wasps being cited as examples.

In regard to the strength of insects, some simple trials with a common hard-back were mentioned. In these trials the hard-back dragged about  $15\frac{1}{2}$  times its own weight, pushed a load equal to 141 times its own weight, and partly carried and partly dragged a load 400 times its own weight.

In the last few years, it has been proved that certain species of insects are responsible for the transmission of certain diseases. Malaria, filarias, and yellow fever, depend upon mosquitos for their transmission, and sanitary measures, based entirely on the destruction of the mosquito, have wonderfully improved the health conditions in many places formerly almost uninhabitable. Malaria was the first of these diseases to be investigated. The malarial parasite of the blood was discovered in 1880, and later, it was discovered that this parasite was transferred by mosquitos of the genus *Anopheles*.

Major Ross, by his work in mosquito extermination in Ismailia, reduced the number of malaria cases from 300,000 to 300 annually. Filaria is caused by a parasitic worm, which is carried by mosquitos of the genus *Culex* in the West Indies. This is the disease which causes elephantiasis or Barbados leg. Yellow fever was shown, by the remarkable work of the American Army surgeons in Cuba, to be a mosquito-carried disease. The mosquito which is responsible for the transmission of yellow fever is *Stegomyia fasciata*. As a result of this discovery, and the crusade against mosquitos which followed, Havana, which was long known as a veritable plague centre, has been freed from this disease. The application of the measures found useful at Havana to the more recent epidemic at New Orleans, produced most gratifying results, and the great change in the conditions at Rio Janeiro is another case in confirmation of the soundness of the principle involved.

In October 1903, a body of 1,200 men, under the direction of Dr. Cruz, were specially employed in destroying the larvae of mosquitos in their breeding places in and around the city of Rio Janeiro, with the result that only nine cases of yellow fever developed in the mid-summer months, January and February 1904, as against 275 cases in the same months in 1903. In the period from 1850 to 1896, 51,600 deaths occurred from yellow fever at Rio Janeiro, and at times as many as 2,000 patients have been cared for in the isolation hospital, which is now closed. The benefits of the war waged on the mosquito at Rio Janeiro have been as great as those obtained at Havana where the vigorous work of the American Army during the occupation of Cuba practically stamped out yellow fever in a city long notorious the world over as a plague centre.

These are striking instances, but others which might be mentioned go further in proving the relation of insects to disease.

Elephantiasis is a form of filaria, a disease proved by Dr. Bancroft, Sir Patrick Manson, and others to be transmitted through the agency of mosquitos.

In addition to these examples, it is now known that sleeping sickness is conveyed by the Tse-tse fly; typhoid fever is often carried by the house fly; an eye disease, 'pink-eye,' in the United States, is communicated by a minute fly; and in Egypt and Fiji a destructive eye disease is carried by the house fly; anthrax is transmitted by gad flies; and diseases of cattle, dogs, and goats are carried by ticks, which though not insects, come into the work of entomologists.

From what has been said, it will be seen that the study of insects leads to more than a consideration of their wonderful structure, their remarkable habits, instincts, and almost reasoning power, and their relationships, though these in themselves are full of interest. Such a study has a bearing on the productiveness of our agricultural lands, and also, since the discoveries of the past few years, on the personal health of residents in the tropics. The 'mosquito theory' is no longer a theory. Scientific accomplishment by workers of several nationalities bears testimony to the facts involved, and English, American, Italian, French, German, and Brazilian scientists have all worked on the subject involved.

The study of insects and the study of medicine have been carried on together, each helping the other, proving to scientists and laity alike the accuracy of these wonderful discoveries which perhaps are destined to have results as far-reaching as any of the 19th and 20th centuries.



## BRITISH GUIANA RICE INDUSTRY.

In a report of an interview with Sir Daniel Morris on November 16 last, the *Demerara Argosy* publishes the following remarks made by the Imperial Commissioner with reference to the rapidly extending rice industry of British Guiana:—

During my visit to Canada, said Sir Daniel Morris, in order to impress the people of the Dominion with the resources and possibilities of the West Indies and British Guiana, I cited the remarkable development of two new industries which had been called into being practically during the last five years.

One was the Sea Island cotton industry, started at St. Vincent, Barbados, and the Northern Islands in 1903, and which is now of the annual value of nearly a quarter of a million sterling, or \$1,200,000. This Sea Island cotton is still capable of further development, and the fine spinners of Lancashire are satisfied that they can look to the West Indies for their supply of this particular class of raw material. The other development to which I drew attention was the singularly interesting one of rice growing in British Guiana. This has been called into existence on a commercial scale within the short period of eight years. The yield of rice in 1899 was under 5,000 tons; in 1902 it had increased to nearly 16,000 tons, and according to the returns published by the Government last year, it had reached a total of 30,000 tons.

In addition to rice, the colony can look forward to a considerable extension of the lime, cocoa-nut, cacao, and rubber cultivations, so that these subsidiary industries may ensure the continued well-being and prosperity of the colony. From the returns of the rice industry it would appear that whilst seven years ago the imports into British Guiana were a little over 25,000,000 lb., last year they had fallen to 6,000,000 lb., showing that during a comparatively short period, the imports had shrunk more than 75 per cent. It is gratifying to learn that though a considerable revenue may have been lost by the falling away in the imports of rice, this has been practically made up by the larger imports of dry goods and other commodities.

British Guiana has arrived at the position that while enormous quantities of rice are being produced locally, which are taking the place of grain formerly imported, it has also begun to export rice to the neighbouring colonies in the British West Indies, and to French and Dutch Guiana. As far as I am able to gather, the first rice exported from British Guiana amounted to 10,506 lb. in 1902-3: this was of the value of \$290. In 1904-5 the exports reached 61,225 lb., of the value of \$1,709, while last year the increase was considerable, the exports amounting to 3,474,512 lb., of the value of \$89,078 (£18,000).

It would appear from a question asked at the address delivered by me on Friday, that some of the growers are concerned as to the best means of disposing of rice straw. It is true that rice straw is capable of being made into paper; on the other hand, if it is to be shipped out of the colony, it will have to be pressed into compact bales and the freight would be considerable as compared with the intrinsic value of the material. It would not be a difficult matter to send sample bales of rice straw from British Guiana to be tested and reported upon by paper makers in Europe or in Canada. In the meantime, the Board of Agriculture would do valuable service if it could persuade the small growers to use the rice straw as fodder and bedding material for their animals, and return the straw in the form of manure to the

land. It is a terrible waste of good manure to burn the straw, as I understand some of the small growers are doing at present. It is absolutely necessary for lands under cultivation to receive back a proportion of the vegetable material taken from them; otherwise they lose their fertility. Rice straw might also be utilized as a mulching material in all kinds of cultivation. It would keep land in good condition during prolonged periods of drought, and it would also keep down weeds and maintain for long periods the productivity of areas under cultivation in limes, cacao, rubber, and fruit trees, without the use of artificial manures.

## RICE INDUSTRY IN BERBICE.

The *Demerara Argosy* of December 7 contained the following communication from its Berbice correspondent with reference to the present condition of the rice industry in the county:—

The weather conditions throughout this year have been most favourable to the cultivation of rice, and were quite in contrast to those experienced last year when rain fell heavily. Such excellent weather is no doubt responsible for the very large amount of paddy obtained, and, though it is impossible to get the correct amount, it is estimated by those best informed that about 100,000 bags have been procured from the county of Berbice. Of this amount 40,000 bags alone have been shipped to the consignment of two large firms.

Some merchants in Georgetown are at present asking \$4.25 to \$4.75 per bag of rice, according to quality. There is room for further development; any amount of suitable lands are lying idle, but the question of an adequate supply of labour is the chief trouble. At present the supply of labour is very inadequate, and this is keenly felt by the growers, who themselves are unable to work up all the land.

## CAMPBOR CULTIVATION IN ALGERIA AND FRANCE.

The question of the possible cultivation of camphor trees in Algeria has lately been receiving attention, according to the *Pharmaceutical Journal*.

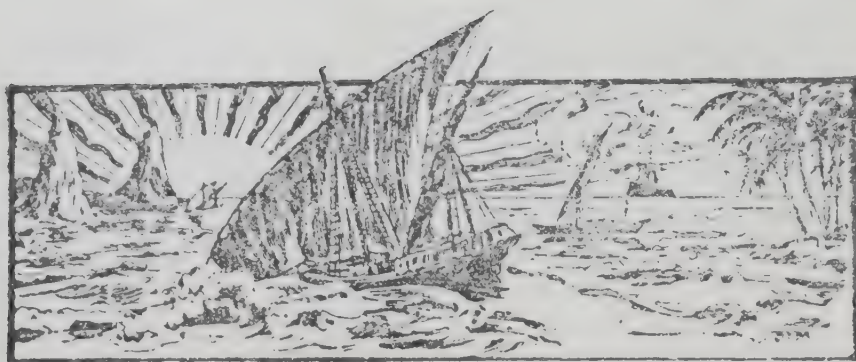
Professor Trabut, Director of the botanical service in Algeria, is strongly of opinion that camphor trees grown there would give a sufficient yield to make the cultivation commercially profitable. He states that he himself extracted from leaves of young camphor trees which he had sown, a very appreciable quantity of camphor, the amount being 1.6 oz. from 6.6 lb. of leafed twigs.

Not long ago, it is also stated, Professor Battandier, of the Medical School, Algiers, made an analysis of the leaves and sprigs of camphor trees sown by Professor Trabut in 1892, and he easily extracted camphor from them in proportions varying from 1 to 1.4 per cent.

M. Tabouriech, who gives an account of the above results in the French *Bulletin de Pharmacie*, mentions that he himself has made analyses of leaves, etc. from a camphor tree growing in a conservatory at the Jardin des Plantes, Montpellier, France. A yield of 0.65 per cent. of camphor was obtained. This is not so good as the yield from the Algerian trees, but as the tree is cultivated in a conservatory, and its supply of light and air is naturally somewhat limited, the smaller return is not surprising.

M. Tabouriech suggests that, in the circumstances, the public authorities should give further consideration to the question of promoting the cultivation, as the results so far obtained warrant such attention being given.





## GLEANINGS.

Demerara exported 10,000 tons of molascuit during 1906. (*Demerara Argosy*.)

Four male Barbados goats, six months old, are offered for sale at the Agricultural School, Dominica. Price 10s. 6d. Applications should be sent to Mr. A. J. Brooks, at the School.

The Secretary of the Jamaica Agricultural Society reports that no molascuit is prepared in Jamaica, but that a similar preparation, 'molassine,' which is made from beet molasses and peat-moss, is imported and sold in the island.

During the past year or two there has been a very large increase in the area devoted to pine-apple culture in Singapore. Extensive areas of hitherto waste land are being planted up, and a pine-apple canning industry is developing. (*Straits Settlements Report*, 1906.)

The *Port-of-Spain Gazette* refers to the prospects of the coming sugar crop of Trinidad as being very promising, and states that the Usine St. Madeleine expects to turn out 16,000 tons of sugar in the 1908 crop season.

The following resolution was passed at the recent Cotton Conference at Atlanta: 'That cotton be packed in a bale similar to the Egyptian bale, the minimum weight of the bale to be 500 lb., the maximum weight 750 lb., and the bale to be marked both ends, showing grade, sample, and weight'.

The number of rice mills that have of late been erected in the county of Berbice, is commented upon by the *Demerara Argosy* as indicating the rapid extension of the industry. Sixteen rice mills have come into existence in Berbice during the last three years. Of these, seven are in the Corentyne district and four in the Canje district.

With reference to the shipment of whales' bones from St. Vincent to Trinidad, mentioned in the last number of the *Agricultural News*, it is stated in the *Kingstown Sentry* that an extensive trade in this article is anticipated during or after the next whaling season in St. Vincent, which extends from January to June.

In a recent report, the U. S. Consul at Kingston refers to the cultivation of kola nuts in Jamaica. The tree grows in moist soil from sea-level up to an elevation of 3,000 feet. When about ten years old from 100 to 150 lb. of nuts are obtained annually. Kola nuts to the value of \$988 were exported to the United States from Jamaica last year.

The output for the past season of the Hawaiian Pine-apple Company's cannery at Iwibi, which is the largest in the world, amounts to 2,250,000 cans of fruit. (*Hawaiian Forester*, September.)

Crop reports from Demerara place the shortage in the present season's sugar crop of the colony at about 16 per cent., compared with the average yield of 120,000 tons. This represents a diminished value of fully \$1,000,000.

The Permanent Exhibition Committees of Trinidad and Grenada sent exhibits of preserves and fruits for display at the Royal Horticultural Show of Colonial Fruits on November 28 and 29. The Norbrook Canning Company of Jamaica, and the West Indian Produce Association were also represented.

A consignment of pimento berries, grown and cured at Nassau, Bahamas, was in 1906, submitted to Messrs. Gillespie of New York, for examination. Messrs. Gillespie report that, excluding the over-ripe berries sent, the quality and flavour were good, and that pimento from the Bahamas should command the same market price as the Jamaica product.

The rainfall of Grenada for 1906-7, measured at the Richmond Hill Observatory, was 83.27 inches, as compared with 77.80 inches in 1905-6, and 78.65 inches, the average of the past sixteen years. There was a severe drought early in 1906, but heavy rains fell from June to October. A second drought, however, was experienced during October and the early part of November. The general climatic conditions of the year were not favourable to cacao production. (*Botanic Station Report*.)

There has recently been quite a boom in the exports of camphor from Foochow, Southern China. In 1902 (the first year of export of this article), the quantity shipped was 222 piculs (1 picul = 133 lb.). This had increased to 4,036 piculs in 1905, and to over 12,000 piculs in 1906. As, however, trees are being rapidly felled, and no young ones planted, the industry cannot continue. Trees do not yield camphor till forty years of age. (*British Consular Report*, 1907.)

Discussing the question of swine breeding, an article in the *American Agriculturist* points out that the present tendency is to breed from immature animals, which cannot give the best results. The writer of the article believes that boars are most valuable for breeding from one year onwards to four years of age. Specially good sires, however, may be retained even two or three years longer. Sows usually give the best litters from eighteen months onward to four or five years old.

The possibility of artificial or synthetic rubber becoming a competitor on the market with the natural product is denied in a statement, coming from a London rubber authority, and published in the *West India Committee Circular* of November 12. It is pointed out that the only known sample of artificial rubber ever prepared was made by Professor Tilden thirty years ago, and cost 200 times the price of the natural article. Professor Tilden to-day does not believe in the commercial manufacture of rubber, nor did the late Dr. Weber, who spent thirty-five years in research in this direction.



## CACAO CULTIVATION AND MINOR PRODUCTS.

A lecture dealing with the above subject was recently delivered by Mr. Herbert Wright, A.R.C.S., F.L.S., in Liverpool, under the auspices of the Incorporated Chamber of Commerce of that city. The lecture dealt primarily with conditions which obtain in connexion with cacao growing in West Africa, where the rainfall is much above the average of the West Indies, but a résumé of the chief points of the lecture may nevertheless be of considerable interest to cacao growers in these islands.

Mr. Wright explained at the beginning of his address, that in the cultivation of cacao, the practice is usually adopted of growing what might be termed temporary catch crops—such as maize, yams, sweet potatoes, eddoes or cassava—between the rows of cacao plants during the first three or four years after the young trees have been planted. These crops not only return a profit during the period before which the cacao comes into bearing, but also shelter the young cacao plants, and prevent the development of weeds.

About 10 feet was mentioned by Mr. Wright as a good average distance between the rows of cacao plants, as well as between the individual plants in the rows, and, allowing a radial development of about 2 feet per annum to the young roots, it follows that, at the end of four years, the ground would be fairly well occupied by these spreading roots, and 'catch cropping' can no longer be followed. It is important that these subsidiary crops must not be planted too closely to the cacao trees, as under such conditions they would check the growth of the roots of the latter plants.

A light sowing of Indian corn was referred to as a satisfactory catch crop, since this product occupied the ground but a short period, and the corn was always in good demand. Mr. Wright lays importance upon the operation of pruning or 'detasselling' (removing the male flowers) from some of the maize plants, a practice the adoption of which he thinks would result in enhancing both the quantity and quality of the corn crop. The Virginian experiments described in a recent number of the *Agricultural News* (Vol. VI, p. 323), however, led to the conclusion that the extra amount of corn obtained as the result of this operation barely paid for the labour of detasselling.

It is not advisable to grow two or three crops of maize in succession between the cacao plants, since the crop is one which takes a large amount of fertilizing matter out of the soil.

Cassava was also strongly recommended for cultivation between the rows of cacao plants. Cuttings are set out from 3 to 8 feet apart between the lines of cacao, and the dense foliage which soon forms keeps the weeds in check. Cassava seems to be a plant which is largely independent of the rainfall, since it flourishes in districts where the rainfall is no more than 14 inches, and also does well where it is over 100 inches.

The banana was the next crop referred to by the lecturer as of value for interplanting with cacao. Its use in this connexion is well known to planters in the West Indies.

Reference was then made to Sea Island cotton, and various fibre plants as crops that might with advantage be planted between the rows of cacao in many cases. With reference to cotton, however, it may be pointed out that the conditions of soil and rainfall which obtain in those districts of the West Indies where cacao finds its most natural surroundings, are not suitable for Sea Island cotton cultivation.

The expensive machinery necessary for the extraction

of the fibre from such plants as sisal hemp and *Sansevieria* puts the cultivation of these plants as catch crops out of the question when such easily cultivated and useful products as bananas, eddoes, and sweet potatoes can be raised.

The lecturer mentioned also that in Java and Ceylon profitable returns have been obtained from the cultivation of citronella and lemon grass on cacao estates. These plants are readily propagated from cuttings and last about three years. Citronella—the more profitable crop of the two—gives a yield of about 50 to 60 lb. of oil per acre, valued at about 1s. 8d. per lb.

In concluding his lecture, Mr. Wright pointed out that, however important it might seem to make all endeavour to raise profitable catch crops in the manner described, yet these crops must only be regarded as subsidiary to cacao, the development of which would be checked if an undue amount of labour and attention was devoted to the minor products.

## COCOA-NUT FIBRE.

In the course of an article entitled 'Fibres of British West Africa,' which appears in the *Bulletin of the Imperial Institute* (Vol. V, No. 2), particulars as to the methods of preparation of the fibre from the husk of the cocoa-nut, known as coir, and the market value of this product, are given. Although cocoa-nut husks are not utilized in this way in the West Indies, yet it is possible that the manufacture of coir may be undertaken in these colonies in the future, and the following notes have therefore been extracted from the article in question:—

The fibrous material of the cocoa-nut husk in its raw state, that is, unbeaten and uncombed, consists of fibres of varying length associated with a quantity of corky tissue. It is necessary to clean and sort the material before shipment, as there is little or no demand for it in a crude state and the cost of freight would exceed the value in England.

For the preparation of coir fibre, the cocoa-nuts should be gathered before they are quite ripe, usually when ten months old. The fibre becomes coarser as the nuts ripen, and then require to be soaked for a long period in order to free it from the corky tissue, with the result that the coir acquires a dark colour. In the old native system of treatment, the cocoa-nuts are soaked in pits of salt water for several months, but in the preparation of the best commercial coir it is now usual to detach the husks, which is accomplished by striking the nuts on sharp spikes fixed in the ground, and to soak these in large tanks of water warmed by steam. The treatment is much shortened in this way.

After soaking the husks, which facilitates the removal of the corky tissue, they are either beaten by hand or passed through a crushing machine. The fibre after leaving the crushing machine is passed into the extractor or breaking-down machine, in which it is completely disintegrated. The product is then treated by a 'winnowing machine,' to remove the dust and other non-fibrous matter.

After being cleaned, it is of great importance that the fibre should be sorted. It is usually separated by a process of combing or hackling, into two grades of different length. The longer or 'brush' fibre is employed as bristles for brush making, whilst the shorter or 'mat' fibre is used for the manufacture of mats or ropes.

The commercial value of the longer or 'brush' fibre is about £16 to £17 per ton; whilst the shorter or mat fibre is worth from £5 to £10 per ton in the London market at the present time.



## CULTIVATION OF LIMES.

While it cannot be expected that the high prices which have recently been obtained for all lime products will become permanent, it would appear that the future prospects of the lime industry of the West Indies are of a promising nature.

Considerable interest has of late been awakened throughout these colonies in the cultivation of limes, and the progress made in the industry in Montserrat and Dominica has induced the planting of limes in British Guiana, Grenada, Carriacou, and St. Lucia.

With the view of generally encouraging the cultivation of this plant, and of affording all available information for the guidance of lime planters, as to the best methods of cultivating their crops, and preparing the products for market, the Imperial Department of Agriculture has in preparation a pamphlet dealing with the cultivation of the lime plant and the manufacture of its products. As it may be some time however, before this can be successfully put through the press, it has been thought that a brief summary might with advantage be printed in the *Agricultural News*, in order to afford all assistance possible to those who have taken up, or purpose to take up, the cultivation of limes.

### TREATMENT OF LAND.

By far the greater area of lime cultivations in Dominica was established on land which had been growing sugar-cane, and if the plants are allowed a sufficiency of room, by careful removal of the cane stools around them, they can successfully be established by means of seedlings, in the cane fields, in the course of a few years.

On some estates, land in grass or guava bush is cultivated, lined, holed, and planted. A circle around the young plant is kept clean, and the remainder of the field cutlassed occasionally. In other cases, the usual garden crops of pigeon peas, tannias, dasheens, cassava, etc., are allowed to grow amongst the young lime plants.

When forest land is to be planted in limes, it is felled, lopped, lined, burned, and then holed, and after planting, a small area around each plant is kept clean, while the bush and grass that spring up in the intermediate spaces are periodically cutlassed.

When lining the fields for planting, it is essential that an efficient system of drainage should be established before any planting is done, and a good system of roads should be outlined in order that the greatest economy in working the estate may be practised. Another matter of importance on exposed land is protection from the full force of the wind, and wind-breaks of pois doux, galba, or other suitable trees should be formed as early as possible. Very often this important work is neglected, and much money thereby lost, for full exposure to the wind has a dwarfing effect on the trees, and a serious effect on the crops.

### CHOICE OF LAND.

Lime trees will develop best, and yield the heaviest crops, in rich well sheltered lands, situated from sea-level up to 300 feet elevation, and possessing a rainfall varying from 80 to 160 inches per annum. Limes can also be successfully cultivated on fairly steep slopes, especially if washing away of the soil is prevented by the presence of numerous boulders, and if the soil is fed with vegetable matter from forest land above the cultivation. In Dominica, slopes have been cleared of forest to the top of the ridge, and lime trees have been established, but careful attention must be given to terracing

and manuring, if it is desired that such cultivations are to be long-lived.

Lime cultivation is now being carried on in Dominica at elevations of up to 2,000 feet, and in districts possessing a rainfall of over 200 inches per year; and given good selection of land, with some protection from wind and good cultural methods, there is little doubt that such cultivation should be profitable. But it is generally understood that, as far as the island of Dominica is concerned, the best results are obtained in the rich coastal and valley lands possessing a light black soil.

### PREPARATION OF SEED BEDS, ETC.

It takes from ten to twelve months from the sowing of lime seeds to the time when strong plants are fit for putting out into the field. Seed beds from 4 to 5 feet wide, and as long as desired, with plants set out at distances of from 2 to 3 feet apart, should be prepared on a sheltered piece of land. The beds should be raised, so as to ensure good drainage, and the soil should be thoroughly broken up. Nursery beds should also be prepared in the same manner for the reception of the young seedlings, in the proportion of five nursery beds to every seed bed, and careful attention should be given to keep tillage in order, so as to ensure the development of a good root system.

Seed for planting purposes should be carefully selected from good, healthy, heavy-bearing trees, and should be placed in a fine sieve and kept stirred by hand, while water is poured over it to remove mucilage. The seeds are then dried in the shade, and when dry they should be planted thinly, at a depth of about an inch, in drills, the distance from drill to drill being about 8 or 9 inches. It is important to remember that lime seeds do not retain their vitality very long, and therefore should be sown as soon as possible after washing and drying. When lime seeds are sown unwashed, they are very often destroyed by rats.

When the seedlings are from 4 to 6 inches high, they are ready to be transplanted into the nursery beds. The plants should be carefully lifted with forks, the roots trimmed, and the stem topped, and they should be set out in rows 8 or 9 inches apart, and with the same distance from plant to plant in the rows.

It is estimated that a seed bed 100 feet long by 5 feet wide, planted with seed in drills 8 inches apart, should give from 5,000 to 6,000 strong seedlings, and these would fill five nursery beds. From these, at least 4,500 plants fit for planting in the field should be obtained.

### PLANTING OUT.

The planting season for limes is from June to December, but early planting is to be recommended, for then the plant has time to make satisfactory growth before the dry season commences.

Limes are planted at varying distances apart, according to individual opinion and locality. In some places, they are planted as close as 10 feet by 10 feet, or 12 feet by 12 feet, while in rare instances, 18 feet by 18 feet, or 20 feet by 20 feet, has been practised. Trees planted at wide distances, when mature, give better results than closely planted trees, for owing to the hemispherical shape of the trees they present a greater bearing area, and probably it may be found that a system of planting the trees 10 to 12 feet apart in the rows, and 20 to 25 feet between the rows, would prove successful, and would facilitate many estate operations such as pruning, manuring, etc. Such a system is further to be recommended, since it would allow sufficient space for apparatus used in spraying operations to pass up the rows conveniently, and the fields should be laid out so that the



rows might run across the direction of the prevailing wind. The plants thus make, in some degree, a protection for themselves.

The land should be carefully lined at the distances chosen, and holes about 18 inches deep, and from 12 to 15 inches square, should be opened for some time before the lime plants are placed out.

When they are from 18 to 24 inches high, the plants are ready for setting out, and they should be carefully lifted with forks from the nursery beds. The ends of the branches should be cut back 3 or 4 inches, and thus the plants should be placed in bundles or baskets or trays for conveyance to the field. The roots should be watered and kept moist until planted, for good results cannot be expected if the roots are allowed to become dry or exposed.

The plants should be carefully placed in the soil, at about the same depth as they grew in the nursery beds, and the lateral roots carefully spread out, while the soil in holes around the plants should be moulded up several inches above the level of the surrounding ground, in order to ensure that no water should settle around the stems and roots during wet weather.

#### AFTER-CULTIVATION.

The lime may under favourable conditions commence to give a few fruits in the third year after planting, but experienced lime planters consider that eight to ten years is the time required to bring a lime plantation into full bearing.

If limes are planted among sugar-cane, the canes are, under good management, gradually removed from the land as the lime trees develop. The same course is followed in respect to limes among garden crops, whereas when they are planted in grass or guava bush, or in newly cleared forest lands, a gradually increased area is cleared around the plants themselves as they develop, and the grass and bush between them are cutlassed occasionally and applied to the soil round the trees as a mulch.

Crops usually grown for green dressings are now being planted in lime plantations, at the time of the first rains, to keep down the weeds during the growing season. They are cut down two or three times during the year to yield a mulch, and early in the dry season should be completely pulled up and used for mulching the lime plants themselves. Of the various green dressings tried, the horse bean (*Canavalia ensiformis*) has proved very useful for growing among young lime trees on the coastal land of Dominica, while in Montserrat the Bengal bean proved of value.

Lime trees require but little pruning, but all suckers and dead branches should be carefully removed. In consideration of the bare-footed workers on a lime estate, all lime-tree prunings should be burned, and not, as is usual with prunings generally, used for manure.

From the time the young trees are planted, the aim of the planter should be to keep the land in good condition by maintaining and, if possible, increasing the humus in the soil, by the application of pen manure, or by means of frequent bunches of bush and grass from adjoining lands.

Very little is known as to the effect of artificial manures on lime plantations, but too much stress cannot be laid upon the good results that accrue from applications of pen manures or of mulch. The appearance of lime plantations has in a short time completely changed by looking to this operation, and most planters are now alive to the benefits to be derived from attention to the 'humus question.'

The life of a lime plantation has not yet been determined, but in Dominica, well-kept fields of limes, planted over thirty years ago, are still in good condition, and yield good crops.

## CALABASH TOBACCO PIPE.

The particulars given below with reference to the production of calabash pipes in Cape Colony, South Africa, form an interesting supplement to the many references that have already appeared in the *Agricultural News* relating to this article (Vol. VI, pp. 269, 298, etc.). The information here given is taken from the *Kew Bulletin*, No. 9, of the present year, and was communicated by Professor H. H. W. Pearson, of Cape Town:—

The plant yielding the fruit from which the calabash pipes are made, is grown in various parts of Cape Colony. In the Robertson district the seed is sown late in August and September. Alluvial soil, containing sufficient lime to make it porous, is most suitable. The fruits are produced from December to May.

The curve of the stalk-end of the fruit, from which the pipe is made, is produced naturally, but when necessary, the production of the proper curve is assisted by artificial means, such as by keeping the fruit in an erect position, so that its weight is borne by the stalk-end.

On ripening, the green colour of the fruit changes to light-yellow. After cutting, it is dried in the sun, and either the whole fruit, or the lower half only, is sent to the manufacturer.

The process of manufacture appears to be very simple. After being cut to its proper size, the future pipe-bowl is boiled, and the softened skin removed by scraping—generally with a piece of glass. The surface is then polished; finally the pipe is provided with a fire-proof lining (a preparation of clay), and a mouthpiece, and the result is a pipe whose capacity is well suited to the bulky Transvaal tobacco, and whose lightness recommends it to every smoker.

In South Africa the calabash is put to various uses in domestic affairs, in the form of water-bottles, flower-pots, ladles, etc.

Calabash tobacco pipes can now be obtained in England, as they are reported to be on sale at one or two places.

## TIMBER RESOURCES OF BAHIA.

The accompanying note as to the timber resources of the very productive Brazilian State of Bahia appeared in the last *Annual Report* of the British Consul:—

The virgin forests which exist throughout the State of Bahia constitute a source of great potential wealth, but one which hitherto has been practically neglected. These forests contain an immense variety of timber of high economic value, but the only species exported from Bahia is rosewood, and that merely on a small scale.

The rosewood of Bahia (*Machaerium* sp.), locally known as 'jacarandá' is a material admirably adapted for the manufacture of furniture of all kinds, of piano cases, and of high-class cabinet work, as well as for internal woodwork, such as stairs, balustrades, wainscoting, etc.

The export of rosewood from Bahia during 1906 amounted to over 1,100 tons, nearly all of which went to the United States, where the timber in question is better known and more highly appreciated than in the United Kingdom.

The supply of readily accessible rosewood in Bahia has become considerably diminished within recent years, but the wood exists in great quantities along the upper waters of the Sao Francisco River, which furnishes a ready means of conveyance to the port of shipment.



## MARKET REPORTS.

**London**,—December 10, 1907, 'THE WEST INDIA COM-MITTEE CIRCULAR'; Messrs. KEARTON, PIPER & Co.; November 15, Messrs. E. A. DE PASS & Co.; 'THE LIVERPOOL COTTON ASSOCIATION WEEKLY CIRCULAR,' November 22, 1907.

ARROWROOT—St. Vincent, 2½d. to 3¼d. per lb.  
BALATA—Sheet, 2/4; block, 1/7 per lb.  
BEES'-WAX—£7 7s. 6d. to £7 10s. per cwt.  
CACAO—Trinidad, 105/- to 114/- per cwt.; Grenada, 105/- to 113/- per cwt.  
COFFEE—Santos, 28/9 per cwt.  
COPRA—West Indian, £22 per ton.  
COTTON—18d. to 20d. per lb.  
FRUIT—  
BANANAS—Jamaica, 4/6 to 5/- per bunch.  
LIMES—3/- to 3/6 per box.  
PINE-APPLES—St. Michael, 1/9 to 3/6 each.  
GRAPE FRUIT—6/- to 11/- per box.  
ORANGES—Jamaica, 5/- to 10/- per box.  
FUSTIC—£4 5s. to £4 15s. per ton.  
HONEY—16s. to 28s. per cwt.  
ISINGLASS—West India lump, 2/- to 2/2 per lb.; cake, no quotations.  
LIME JUICE—Raw, 1/1 to 1/5 per gallon: concentrated, £21 per cask of 108 gallons; Distilled Oil, 1/11 to 2/- per lb.; hand-pressed, 4/3 to 4/6 per lb.  
LOGWOOD—£4 5s. to £4 15s. per ton; Roots, no quotation.  
MACE—Fair, 1s. to 1s. 3d.; pale, 1s. 4d.; broken, 10d. to 1s.; ordinary, 1s. to 1s. 1d. per lb.  
NUTMEGS—75's, 8d.; 77's, 6d.; 92's to 103's, 5½d. to 6½d.; 112's to 134's, 4¾d.  
PIMENTO—Market quiet, 3¼d. per lb.  
RUBBER—Fine hard Para, 4s. 3¼d. to 4s. 4½d.; fine soft, 4s. 3¼d. to 4s. 3½d. per lb.  
RUM—Jamaica, common, 2s. 7d.; good, 2s. 10d.; fine, 3s. to 8s.; Demerara, 1s. 1d. to 1s. 2½d. per proof gallon.  
SUGAR—Crystals, 17/6; Muscovado, 9/4½; Molasses, 11/ to 11/6.

**New York**,—November 29, 1907.—Messrs. GILLESPIE BROS. & Co.

CACAO—Caracas, 22c. to 25c.; Grenada, 22c. to 23c.; Trinidad, 22c. to 24½c.; Jamaica, 17c. to 21c. per lb.  
COCOA-NUTS—Jamaica, select, \$27.00 to \$30.00; culls, \$17.00; Trinidad, \$20.00 to \$21.00; culls, \$15.00.  
COFFEE—Jamaica, ordinary, no quotation; good washed, 6c. to 10c.; per lb.  
GINGER—Fairly bold dark, 3/-; small to bright bold, 14½c. to 14¾c. per lb.  
GOAT SKINS—Jamaica, 54c.; Barbados, Antigua, and other West India, 43c. to 52c.  
GRAPE FRUIT—Jamaicas, \$4.60 to \$6.50 per barrel, \$2.25 to \$3.50 per box.  
LIMES—\$4.50 to \$5.00 per barrel.  
MACE—27c. to 31c. per lb. according to colour and quality.  
NUTMEGS—110's, 9½c. to 10c. per lb.  
ORANGES—Jamaica \$3.00 to \$3.30 per barrel, \$1.50 to \$2.00 per box.  
PIMENTO—5¾c. to 6c. per lb.  
SUGAR—Centrifugals, 96°, 3.60c. to \$3.67; Muscovados, 89°, 3.17c.; Molasses, 89°, \$2.90 per lb., duty paid.

## INTER-COLONIAL MARKETS.

**Barbados**,—Messrs. JAMES A. LYNCH & Co., December 10, 1907; Messrs. T. S. GARRAWAY & Co., December 9, 1907; Messrs. LEACOCK & Co., December 16, 1907.

ARROWROOT—St. Vincent, \$4.25 to \$4.50 per 100 lb.  
CACAO—Dominica, \$17.00 to \$20.00 per 100 lb.  
COCOA-NUTS—\$12.50 to \$18 per M. for husked nuts.  
COFFEE—Jamaica, \$8.25 to \$10.50 per 100 lb.  
HAY—\$1.80 per 100 lb.  
MANURES—Nitrate of soda, \$62.00 to \$65.00; Ohlendorff's dissolved guano, \$55.00; Cotton manure, \$42.00; Cacao manure, \$42.00 to \$48.00; Sulphate of ammonia, \$72.00 to \$75.00; Sulphate of potash, \$67.00 per ton.  
ONIONS—Madeira, \$1.75 to \$2.00 per 100 lb.  
POTATOS, ENGLISH—\$1.76 to \$2.10 per 160 lb.  
PEAS—Split, \$6.00; Canada, \$3.85 per bag.  
RICE—Demerara, \$4.50 to \$4.54 (177 to 180 lb.); Patna, \$3.65 to \$4.00; Rangoon, \$2.86 to \$3.10 per 100 lb.  
SUGAR—48c. per 100 lb.

**British Guiana**,—December 14, 1907.—Messrs. WIETING & RICHTER; Messrs. SANDBACH, PARKER & Co.

ARROWROOT—St. Vincent, \$10.50 per barrel.  
BALATA—Venezuela block, 32c.; Demerara sheet, 48c. per lb.  
CACAO—Native, 20c. to 24c. per lb.  
CASSAVA—No stock.  
CASSAVA STARCH—\$7.50 to \$9.00 per barrel.  
COCOA-NUTS—\$12.00 to \$22.00 per M.  
COFFEE—Creole, 8c. to 13c.; Jamaica, 12c. per lb.  
DHAI—\$4.10 to \$4.50 per bag of 168 lb.  
EDDOS—\$2.16 to \$2.40 per barrel.  
MOLASSES—Yellow, 17c. to 18½c.; Dark, 10c. to 16c. per gallon.  
ONIONS—Madeira, 3c.; Lisbon, 2½c. per lb.  
PLANTAINS—20c. to 60c. per bunch.  
POTATOS,—Madeira, \$3.00 to \$3.25 per barrel.  
POTATOS, SWEET—Barbados, \$1.20 per bag.  
RICE—Ballam, \$6.25 to \$6.40; Creole, \$4.50 to \$4.85 per bag; Seeta, \$6.00 per bag.  
RUBBER—¾ to 3/10 per lb.  
SPLIT PEAS—\$4.00 to \$7.75 per bag (210 lb.).  
TANNIAS—\$3.60 per bag.  
YAMS—White, \$3.50; Buck, \$4.00 per bag.  
SUGAR—Dark crystals, \$1.95 to \$2.89; Yellow, \$2.88 to \$2.90; White, \$3.50 to \$4.71; Molasses, \$1.70 to \$2.55 per 100 lb. (retail).  
TIMBER—Greenheart, 32c. to 55c. per cubic foot.  
WALLABA SHINGLES—\$3.50 to \$5.50 per M.  
——FIREWOOD—\$2.25 per ton (3-feet lengths).

**Trinidad**,—December 14, 1907.—Messrs. GORDON, GRANT & Co.

CACAO—\$22 to \$23.25 per fanega; Venezuelan, \$22.50 per fanega.  
COCOA-NUTS—No quotation.  
COCOA-NUT OIL—70c. to 75c. per Imperial gallon.  
COFFEE—Venezuelan, 7c. to 7½c. per lb.  
COPRA—\$3.25 to \$3.40 per 100 lb.  
DHAI—\$4.25 to \$4.40 per 2-bushel bag.  
ONIONS—\$2.25 to \$2.50 per 100 lb. (retail).  
POTATOS, ENGLISH—\$2.25 to \$2.40 per 100 lb.  
RICE—Yellow, \$5.50 to \$5.60; White, \$5.50 to \$6.00 per bag.  
SPLIT PEAS—\$6.00 to \$6.10 per bag.  
SUGAR—\$5.00 to \$5.10 per 100 lb.



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